

Army Regulation 420–49

Facilities Engineering

Utility Services

**Headquarters
Department of the Army
Washington, DC
19 September 2005**

UNCLASSIFIED

SUMMARY of CHANGE

AR 420-49

Utility Services

This administrative revision dated 19 September 2005--

- o Replaces "installation" with "garrison" throughout.
- o Replaces Architectural and Engineering Instructions (AEI), U.S. Army Corps of Engineers, with Technical Instruction 800-01 throughout.
- o Updates required and related references.
- o Updates organizational names and addresses and office symbols throughout.
- o Makes administrative changes throughout.

This revision--

- o Combines seven existing utility regulations into a single regulation.
- o Changes proponent for this regulation to Assistant Chief of Staff for Installation Management (ACSIM).
- o Changes the title to "Utility Services."
- o Announces the transfer of responsibility for vertical lift devices to AR 420-70 (Buildings and Structures).
- o Replaces the term "facilities engineer" with "Director of Public Works" (para 1-4f).
- o Allows use of municipal, regional, and private utility service contractors where their use provides environmental, pollution control, and other operational advantages to the Army (para 2-1a).
- o Encourages installation to participate in local and regional utilities planning organizations (para 2-1a).
- o Requires installations to develop a utilities management plan (para 2-1d).
- o Requires installations to develop and maintain utility system maps (para 2-1d).
- o Requires installations to develop and implement emergency response plans for each type of utility service (para 2-1f).
- o Transfers responsibility for Hazardous, Toxic, and Radiological waste to AR 200-1 (para 2-2c).
- o Requires certification of utility plant operators (para 2-4).

- o Requires installations to train all personnel involved in the design, construction, or management of gas distribution systems (para 2-4b).
- o Requires solid waste disposal to be based on Integrated Solid Waste Management (para 3-2a).
- o Requires installations to develop and implement an installation solid waste management plan (para 3-2b).
- o Recommends source reduction to reduce volume of solid waste stream (para 3-3b).
- o Requires a Qualifying Recycling Program, where LCC effective, to reduce volume of waste stream (para 3-3e).
- o Broadens local authority for boiler and heating plant staffing (para 6-3f).
- o Requires installations to design, construct, operate and maintain gas distribution systems in accordance with the requirements of title 49 of the Code of Federal Regulations, part 192 (para 6-8a).
- o Transfers responsibility for fire alarm systems to AR 420-90 (Fire Protection).
- o Revises management control provisions in accordance with AR 11-2. This regulation contains key management controls that must be evaluated (app C).
- o Prescribes the following forms: DA Form 3916 (Daily Log of Truck Trips for Refuse Collection and Disposal), DA Form 3917 (Refuse Collection and Disposal), DA Form 4141 (Facilities Engineering Operating Log (Water--General), DA Form 4178 (Facilities Engineering Operating Log (Sewage--Supplementary), DA Form 4247 (Facilities Engineering Operating Log (Sewage--General), and DA Form 4374 (Repairs and Utilities Operating Log (Water--Supplementary).

Effective 19 October 2005

Facilities Engineering

Utility Services

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER

General, United States Army

Chief of Staff

Official:



SANDRA R. RILEY

*Administrative Assistant to the
Secretary of the Army*

History. This publication is an administrative revision. The portions affected by this administrative revision are listed in the summary of change.

Summary. This regulation establishes policies, criteria, and procedures for facilities engineering responsibilities for utilities management and services. It describes the responsibilities, regulatory requirements, and procedures for providing and managing utility services at Army installations in a safe, efficient, and environmentally sound manner.

Applicability.

a. This regulation applies to all commanders of major Army commands, major subordinate commands, field operating agencies, garrisons, and activities under the control of the Department of the Army by ownership, lease, or similar instrument, under the following conditions of use:

(1) Active garrisons and activities used by the Active Army, those held in an inactive or standby condition for future use by the Active Army, and those in an excess category (see AR 405–90 for further guidance).

(2) Installations and activities that are Government owned and Government operated.

(3) Installations and activities that are Government owned and contractor operated (see AR 700–90).

(4) Installations and activities that receive Federal support that are in full-time or intermittent use by the Army National Guard/Army National Guard of the United States, U.S. Army Reserve, or Reserve Officers Training Corps.

(5) In areas outside of the Continental United States, this regulation applies to all Federal departments and agencies that are tenants on an Army installation. This includes foreign official organizations under joint-use agreements and any Governmental or private organization licensed to operate within an Army garrison.

b. This regulation does not apply to—

(1) Installations and activities, or parts thereof, licensed (that is, not Federally operated) to any Commonwealth or State of the United States, to the Commonwealth of Puerto Rico, to the District of Columbia, to the Territory of the Virgin Islands, and the Territory of Guam for use by the Army National Guard.

(2) Civil works functions of the U.S. Army Corps of Engineers.

(3) National cemeteries.

(4) Facilities occupied by Army activities as tenants (not located on Army garrisons) that are supported by another Government agency. (An example is facilities occupied by an Army activity supported by the General Services Administration.)

Proponent and exception authority.

The proponent of this regulation is the Assistant Chief of Staff for Installation Management. The proponent has the authority to approve exceptions or waivers to this regulation that are consistent with controlling law and regulations. The proponent may delegate this approval authority, in writing, to a division chief within

the proponent agency or its direct reporting unit or field operating agency, in the grade of colonel or the civilian equivalent. Activities may request a waiver to this regulation by providing justification that includes a full analysis of the expected benefits and must include formal review by the activity's senior legal officer. All waiver requests will be endorsed by the commander or senior leader of the requesting activity and forwarded through their higher headquarters to the policy proponent. Refer to AR 25–30 for specific guidance.

Army management control process.

This regulation contains management control provisions and identifies key management controls that must be evaluated.

Supplementation. Supplementation of this regulation and establishment of command and local forms are prohibited without prior approval from the Assistant Chief of Staff for Installation Management: ATTN DAIM–FDF–U, Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Washington, DC 20310–0600.

Suggested improvements. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to ATTN DAIM–FDF–U, Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Washington, DC 20310–0600.

Distribution. This publication is available in electronic media only and is intended for command levels C, D, and E for the Active Army, the Army National Guard/Army National Guard of the United States, and the U.S. Army Reserve.

*This regulation supersedes AR 420–49, dated 28 April 1997.

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Chapter 1 Introduction

1-1. Purpose

This regulation establishes policies and responsibilities for operation, maintenance, repair, and construction of facilities and systems for the efficient and economical management of utility services (which includes water supply, wastewater, solid waste (nonhazardous), electric, heating and cooling, refrigeration, and food service equipment) at Army garrisons.

1-2. References

Required and related publications and prescribed and referenced forms are listed in appendix A.

1-3. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the Glossary.

1-4. Responsibilities

a. The Assistant Secretary of the Army for Installations and Environment. The Assistant Secretary of the Army for Installations and Environment (ASA (I&E)) establishes policy sets standards, proposes programming and funding for these programs, and provides program direction and guidance for utility services.

b. The Assistant Chief of Staff for Installation Management. The Assistant Chief of Staff for Installation Management (ACSIM) is responsible for Department of the Army (DA) staff supervision and technical guidance for facilities engineering and housing functions. The ACSIM formulates DA policy guidance, objectives, criteria, and standards for facilities engineering and housing functions. The ACSIM will—

- (1) Ensure this regulation is consistent with current Federal regulations governing utility services.
- (2) Provide DA Staff supervision and technical policy direction for utility services.
- (3) Provide guidance and direction to major Army commands (MACOMs) on the implementation of this Army regulation (AR).

(4) Provide DA policy guidance and criteria for selecting energy sources to be used for Army facilities.

c. Major Army command commanders. Commanders of major Army commands (MACOMs) are responsible for ensuring that technical direction, policies, and procedures at their installations are in accordance with this AR.

d. The Chief of Engineers. The Chief of Engineers (COE) is responsible for the design and construction of facilities for utility services.

e. Installation commanders. The installation commander is responsible for providing utility services in compliance with applicable standards, laws, and regulations. The installation commander is responsible for developing and implementing an Installation Utilities Management Plan that will provide safe, efficient, reliable, and Life Cycle Cost (LCC) effective utility services to the installation, all sub-installations, and support and tenant activities. The utilities management plan will include modernization and privatization programs where applicable.

f. Director of Public Works. The Director of Public Works (DPW) is the principal staff officer reporting to the garrison commander, or appropriate commander at outside of the Continental United States (OCONUS) installations, who is responsible for all utility functions. The DPW will—

(1) Provide safe, efficient, reliable, and LCC effective utility services that provide for the health and well-being of soldiers and their families and other assigned personnel and enable the installation to meet mission requirements.

(2) Review all installation and tenant construction, alteration, and repair projects to ensure they are adequate and compatible with existing utility systems, energy conservation goals, and the installation master plan.

(3) Review utility services and utility service contracts annually to ensure requirements are in accordance with installation needs.

(4) Coordinate with the Staff Judge Advocate on interpretation of statutes and regulations impacting utilities management.

(5) Coordinate with the installation medical authority (IMA) on utility service planning (for example, Memorandum of Agreement (MOA) for design review).

(6) Provide for protection and security of utility systems. Coordinate protection and security requirements with installation provost marshal.

g. The Commanding General, U.S. Army Aviation and Troop Command. The Commanding General, U.S. Army Aviation and Troop Command (ATCOM), is responsible for depot maintenance of service station-type dispensing pumps and systems and arrangements for provision of repair parts.

h. The Commanding General, U.S. Army Petroleum Center. The Commanding General, U.S. Army Petroleum Center (USAPC), will—

- (1) Train and certify qualified coal samplers (Technical Bulletin (Engineering) (TB ENG) 249).
- (2) Develop requirements schedules.
- (3) Develop requirements policy.

- (4) Submit requirements to Defense Fuel Supply Center (DFSC), Defense Logistics Agency.

Chapter 2

Utility Services

2-1. Army policy

Army policy is to provide safe, reliable, efficient, and Life Cycle Cost (LCC) cost effective utility services that promote the health and welfare of the soldier and the soldier's family, of the civilian and contractor work force, and of retirees and that provide the capability for garrisons to accomplish assigned missions.

a. Army policy is to obtain utility services from local, municipal, or regional (public and private) authorities, rather than expand, build, or operate and maintain Army-owned utility systems. Environmental considerations, legal liabilities, manpower shortages, and reduced funding for operation and mission requirements can make it more advantageous for the Army to obtain utility services, when cost effective, from local, municipal, regional and private service contractors. Garrisons should participate in local, municipal, and regional utility planning organizations. The use of local, municipal, or regional (public and private) utility systems where the LCC exceeds that of an Army-owned utility system requires ACSIM approval.

b. In providing utility services, Army garrisons will comply with all applicable Federal laws and regulations. Applicability of State and local laws and regulations to garrison utility services will be referred to the garrison Staff Judge Advocate General for interpretation. Army garrisons that are OCONUS will comply with the final governing standards (FGS) issued by the Department of Defense (DOD) Executive Agent for the host nation concerned. The FGS may be predicated on the Overseas Environmental Baseline Guidance Document. Department of Defense Directive (DODI) 4715.5 authorizes the Executive Agent to establish and enforce environmental compliance standards.

c. Long term (up to 30 years) utility contracts may be entered into with a third party that will build, own, and operate utility systems with private venture capital, to provide utility services to an Army garrison. Congress encourages the DOD to aggressively pursue third-party financing before any future large utility plants are authorized for military construction funding. Guidance is provided in the Defense Energy Program Policy Memorandum titled, "Private-Sector Financed Defense Energy Contracts," under section 2394, title 10, United States Code (10 U.S.C. 2394). To determine the LCC of a private-sector proposal, only those costs and benefits that are directly associated with the proposal should be used in the economic analysis.

d. Garrisons will develop and implement an Installation Utilities Management Plan (IUMP.) The installation plan will consider current Army utilities strategy by incorporating key elements into its plan. The plan will document current utility practices; evaluate current and future garrison and tenant needs based on garrison mission, size, economic and environmental considerations; identify required resources; and outline a strategy to implement the selected program options. The IUMP will include utility system maps and sections on energy, solid waste management, corrosion control, and emergency response, as well as other plans required by this regulation. Guidance on preparing the plan is in Public Works Bulletin (PWB) 420-10-08 and Engineers Technical Letter (ETL) 1110-3-404.

e. Garrisons will conduct utility vulnerability analyses and prepare remedial action plans to ensure mission support in event of disruption to major utility systems.

f. Garrisons will develop and implement emergency response plans for each type of utility service. The DPW will develop these plans in coordination with the local utility, the provost marshal, and the garrison emergency and disaster relief activities.

g. Garrisons should participate in local and regional utility resource planning organizations to become a good neighbor and partner in helping solve utility issues.

h. All large repair, alteration, and Military Construction, Army (MCA), projects for utility services will include an analysis of privatization opportunities.

i. Nonappropriated fund (NAF) facilities are defined as "Federal Buildings" and will be managed in compliance with all applicable energy and water conservation laws and regulations.

2-2. General

a. Operation, maintenance, and repair of utility systems and facilities will be in accordance with AR 420-10 para 3-4.

b. Construction projects will be in accordance with AR 415-15 (chapter 1) and AR 420-1, para 4-1.. Where required by Federal or State law, construction projects will be submitted to State regulatory authorities for review prior to being included in the Military Construction Program budget request.

c. Environmental protection and enhancement and hazardous, toxic, and radioactive waste management will be in accordance with AR 200-1 and AR 200-2.

d. Energy conservation programs and reduction targets will be in accordance with AR 11-2 (chapter 8).

- e. Contracts for the acquisition and resale of utility services will be in accordance with AR 420–41 (para 1-4d and 2-1), AR 215–1, (Chapter 7), AR 210-50, (para 2-23e), and DODI 4000.19.
- f. Installation master planning will be in accordance with AR 210–20.
- g. All excavations, including fence post holes (regardless of by whom made), will be coordinated with the DPW. Locations of all underground lines will be verified and all permits will be obtained prior to beginning work.
- h. The most LCC effective approach will be performed in accordance with AR 11–18 (chapter 5) and the Memorandum of Agreement on Criteria/Standards For Economic Analyses/Life Cycle Costing For MilCon Design.

2–3. Safety and occupational health

Utility systems and facilities will be designed, operated, and maintained so as to protect the health and safety of the military and civilian work force in accordance with AR 385–10.

2–4. Utility plant operators

Utility plant operators and maintenance and supervisory personnel will be provided sufficient training to operate and maintain the utility plants in a safe, reliable, and efficient manner. Utility plant operators and maintenance personnel will meet applicable Federal, State, local or host nation certification requirements for the State or host nation in which they are located.

a. *Operator training and certification.* Utility operators will be trained and certified in accordance with applicable existing Federal, State, local, or host nation standards. In the absence of Federal, State, local, or host nation certification requirements for boiler plant operators, the Fourth Class Power Engineer Certification Program of the National Institute for the Uniform Licensing of Power Engineers, Inc., will be the governing requirement.

b. *Installations with gas.* Garrisons with gas (natural gas, manufactured gas, and vaporized liquified petroleum gas (LPG) products; that is, propane and propane/air mixtures) distribution systems will establish procedures to provide training for personnel working on or involved with the design, construction, or management of these systems. The training will provide all personnel with general knowledge of part 192, title 49, of the Code of Federal Regulations (49 CFR 192). The training will also provide specific knowledge and capabilities to individuals in the areas of their assigned duties relating to the functions identified in 49 CFR 192. Special training, such as welding of steel gas pipe and joining plastic pipe by fusion or operation and utilization of gas leak detection equipment, will be obtained from sources qualified to teach these subjects. Contracts involving gas systems will specify that only qualified gas system workers will be used.

Chapter 3 Solid Waste Management

3–1. Solid waste management policy

This chapter establishes policy and criteria for the operation, maintenance, repair, and construction of facilities and systems for efficient and economical solid (non-hazardous) waste management including source reduction, re-use, recycling, composting, collection, transport, storage, and treatment of solid waste.

a. Solid waste management (SWM) will be in accordance with the Solid Waste Disposal Act (SWDA) of 1976, as amended, 42 U.S.C. 6901, et seq. (commonly referred to as the Resource Conservation and Recovery Act (RCRA)), the National Environmental Policy Act (NEPA) (42 U.S.C.A. 4321, et seq.), and applicable Environmental Protection Agency (EPA), State, and local regulations and requirements.

b. Regulated medical waste management will be in accordance with AR 40–5 and AR 40–61.

c. Operations, maintenance, and repair of SWM facilities and/or equipment for collection, handling, and compacting will be in accordance with AR 420–18 and TM 5–634.

d. Design criteria and standards for sanitary landfills will be in accordance with 40 CFR 258 and TI 800–01.

e. Army-owned and -operated SWM facilities (landfills, incinerators, recycling centers, and so forth) will not be used as a municipal or regional SWM facility or as the SWM facility for surrounding communities.

f. Solid waste dumping at unauthorized sites is prohibited. Unauthorized dump sites will be controlled and mitigated in accordance with the integrated solid waste management plan. Scavenging and picking through refuse in containers, dumpsters, or landfills is prohibited.

3–2. Integrated solid waste management

a. Army solid waste policy is based on the concept of Integrated Solid Waste Management (ISWM). Planning for ISWM is designed to minimize the initial input to the waste stream through source reduction, reducing the volume of the waste stream requiring disposal through re-use and recycling, and finally disposing of solid waste through the effective combination of composting, incineration, or landfill treatment. Full implementation of the ISWM concept and

the coordinated evaluation of all elements of the solid waste stream from source generation to disposal will result in an effective garrison ISWM program.

b. Garrisons will develop and implement a garrison ISWM plan. The garrison ISWM plan will document current waste management practices; evaluate current and future needs based on garrison mission, size, and economic and environmental considerations; identify required resources; and outline a strategy to implement the selected program options. The garrison ISWM plan will be reviewed and updated as required. Guidance on development of ISWM plans is available from the U.S. Army Center for Public Works (USACPW).

c. To reduce the volume of the waste stream, enhance pollution abatement and conserve natural resources, ISWM plans will include the following:

(1) Source reduction programs to reduce the initial amount of material coming onto the garrison or generated by the garrison and ultimately requiring disposal to the solid waste stream.

(2) Qualifying recycling programs (QRPs) in accordance with the Military Construction Codification Act (Public Law 97-214, 10 U.S.C. 2577).

(3) Yard waste management programs encompassing minimum lawn maintenance, native planting, and organic composting.

d. The cost for ISWM services will be held to a minimum through comprehensive solid waste management, planning, and an effective solid waste reduction and recycling program. An LCC analysis will be performed to determine the most cost effective approach to ISWM.

3-3. Source reduction, source separation, resource recovery, re-use, recycling, and composting

a. The ISWM plan will establish or expand source reduction, source separation, resource recovery, re-use, and a QRP to reduce the waste stream volume, enhance pollution control, and conserve natural resources when such programs are LCC effective. The garrison should determine what markets exist, if any, and the costs and prices associated with the markets. Technical information on ISWM is in Public Works Technical Bulletin (PWTB) 420-49-08.

b. Source reduction should be used to reduce the initial input to the solid waste stream by specifying that the minimum packing and packaging materials be used for items shipped to the garrison. Industrial and administrative processes should be evaluated to reduce waste. Technical information on source reduction is in PWTB 420-49-02.

c. Source separation should be used to remove recyclable, recoverable, and marketable materials in order to reduce the quantity of solid waste material requiring landfill disposal.

d. Garrisons are encouraged to establish re-use programs to reduce the amount of material requiring disposal action.

e. Garrisons will implement a QRP, where LCC effective. Garrisons having several recycling programs will incorporate them into a single garrison QRP. Activities operating under special funding categories, such as commissaries, post exchanges, and industrial funds, may have a separate recycling program or donate their recyclable materials to the garrison QRP. A QRP is a program where the garrison commander has established—

(1) Procedures for segregating and collecting, and selecting specific materials intended to be recycled;

(2) Methods for maintaining fiscal accountability of funds received from the sale of recycled materials and the disbursal of these funds; and

(3) A process to review all projects and activities funded from the proceeds of the sale of recycled materials.

f. The Defense Logistics Agency (DLA) is responsible for the sale of recyclable materials generated from an appropriated fund source (DOD assets.) With the approval of the MACOM, a garrison may directly sell recyclable materials acquired with appropriated funds if the direct sale is expected to be cost effective (see DODI 4715.4).

g. When the Defense Reutilization and Marketing Service (DRMS) sells materials for the garrison, it uses DOD 4160.21- M to return funds to the garrison and DFAS-IN 37-100 for financial accounting procedures. One hundred (100) percent of the proceeds from the sale of recyclable materials at an garrison with a QRP will be credited to the garrison F3840 Budget Clearing Account (Suspense).

h. The distribution of proceeds from a QRP will be in accordance with the Military Construction Codification Act (Public Law 97-214, 10 U.S.C. 2577). Proceeds will be used to reimburse the garrison for costs incurred by the garrison in operating and maintaining the QRP. After reimbursement of these costs, garrison commanders may use up to 50 percent of the remaining sale proceeds for pollution abatement, energy conservation, occupational safety, and health activities. Any remaining proceeds may be transferred to the garrison Morale, Welfare, and Recreation Fund, a nonappropriated fund (see AR 215-1).

i. Composting is a means to divert large portions of the waste stream from landfills. Composting can provide materials suitable for soil conditioners, landscape mulch, backfill, resurface material for eroded areas, and landfill cover. General guidance on composting is contained in EPA publication EPA/530-R95-023, *Decision-Makers Guide to Solid Waste Management*, published August 1995. Information on composting of yard waste is contained in the EPA Publication EPA/530-SW-89-038, *Yard Waste Composting*, published April 1989.

j. Environmental considerations of source reduction, re-use, and resource recovery/recycling shall be in accordance with AR 200-1. All recycling and composting facilities shall be designed and operated to comply with all applicable

Federal, State, and local wastewater discharge, air emission, and occupational safety and health requirements. Technical guidance is provided in PWTB 420-47-06, PWTB 420-47-07, PWTB 420-49-07, and PWTB 420-49-08.

3-4. Solid waste collection and storage

a. Solid waste will be collected on a regular and systematic basis from designated pickup stations. Collection frequency will be established in accordance with TM 5-634. The collection frequency will be kept to the minimum required to maintain sanitary conditions while performing the required collection service at the lowest possible cost.

b. Special collection schedules and special handling procedures should be established for unique garrison activities (special events and parades), bulky waste, or waste that is different from what is normally collected and disposed. Reimbursement from waste generators for the cost of collecting solid waste that requires special handling can be required.

c. Curbside or service-drive solid waste collection will be used unless another method provides a cost or environmental advantage to the Army. The use of other than curbside or service-drive collection will be supported by an economic analysis, which will be retained at the garrison.

d. Unit relocation, building demolition, new construction, base closure and rehabilitation action, seasonal peak workloads, mission changes, and ISWM planning can affect the number of containers and collection schedules required to dispose of solid waste. In-house operations and solid waste collection and disposal contracts should be reviewed for cost savings whenever significant quantities of solid waste collections are reduced. This review will include field verification to ensure that these provided services use the minimum number of containers, collect at the minimum collection frequency, and charge the lowest possible cost.

e. Garbage and refuse collection containers should be cleaned as often as necessary to prevent insect and rodent harborage and to maintain sanitary conditions. Individual users are responsible for washing residential-type garbage cans.

3-5. Thermal processing of solid (non-hazardous) waste

a. Thermal processing facilities will be designed and operated to comply with all applicable Federal, State, and local wastewater discharge, air emission, and occupational safety and health requirements. The surrounding environment will be kept clean to prevent the spread of disease and the breeding of disease vectors. Installations will retain a permanent record of major considerations and design rationale leading to project authorization and construction.

b. The thermal processing facility will be operated and maintained in accordance with design requirements. Only waste for which the facility has been specifically designed and permitted will be accepted. The facility operator is responsible for preparing a DPW approved standing operating procedure (SOP). This SOP is required reading for all plant personnel. It will be available at the facility as a reference and describe the following:

- (1) The various tasks to be performed.
- (2) Operating procedures.
- (3) Safety precautions for various areas of the facility.
- (4) Waste excluded from thermal processing.
- (5) Environmental requirements.

3-6. Land disposal of solid (non-hazardous) waste

a. EPA regulations (40 CFR Parts 257 and 258) and State and local land disposal criteria will be used in the design of all non-hazardous solid waste land disposal sites (including sites for construction debris, ash, tree stumps and brush disposal). Details concerning the site selection, design, operation, monitoring, and maintenance of landfills are published in 40 CFR 258, the TI 800-01, and TM 5-634. Garrisons will retain a permanent record of major considerations and design rationale leading to project authorization and construction.

b. Controls will be established to ensure that only waste specified in the permit and for which the facility has been specifically designed will be accepted. The surrounding environment will be kept clean to prevent the spread of disease and the breeding of disease vectors. Pesticide containers will be disposed of in accordance with AR 200-5.

c. Recovery of landfill gases for energy utilization purposes is encouraged when cost effective.

d. Construction and demolition debris should be recycled when possible. Construction and demolition debris landfills may be located on Army garrisons where they are LCC effective. Construction and demolition debris landfills will be operated in accordance with applicable Federal and State regulations.

e. The garrison master plan will be annotated to record the exact location and legal description (including monitoring plan and type of liners) of closed and open landfills. This information will be provided to the appropriate U.S. Army Corps of Engineers District to update the garrison real estate records.

f. Projects for new solid waste sanitary landfills or the expansion of existing sanitary landfills on Army garrisons will not be programmed where a municipal or regional system is available until all alternatives to the Army constructing a new solid waste sanitary landfill or expanding an existing one are fully explored. This analysis will be

submitted in the project documentation, including the LCC analysis comparing the proposed construction of an Army owned and operated landfill or expansion of an existing landfill with the municipal or regional system.

3-7. Equipment and personnel safety

a. ISWM activities will be conducted according to applicable safety standards. Recycling, composting, thermal processing facilities, and landfills will be designed, operated, and maintained so as to protect the health and safety of operating personnel.

b. Safety standards for solid waste operational personnel will be established in coordination with the garrison safety office. Operating procedures will be reviewed at least annually to ensure compliance with applicable safety standards.

c. The equipment used to compact, collect, and transport solid waste or materials separated for recycling will be operated and maintained to minimize health and safety hazards to SWM personnel and the public.

d. Solid waste collection containers and vehicles will be washed as necessary to remove putrescible waste residue to prevent nuisances and the propagating or attracting of flies, mosquitoes, and rodents.

3-8. Petroleum, oils, and lubricants

a. Used petroleum, oils, and lubricants (POL) will be disposed of in accordance with AR 200-1. Used oil management is governed by 40 CFR 279 or State regulations. Used POL will not be used as a dust suppressant.

b. The generator of used POL products is responsible for providing appropriate collection facilities, adequate used POL collection operations, and appropriate environmental safeguards when handling used POL products. Generators are responsible for ensuring that prohibited solvents are not mixed with waste oil or POL products. The garrison Hazardous Waste Management Plan (HWMP) and the Spill Prevention Control and Countermeasures Plan (SPCCP) describe generator responsibilities and operational procedures for POL storage sites.

c. Central facilities may be provided for recycling or treatment of used POL products through the Defense Reutilization and Marketing Office (DRMO) when enough used POL generators exist to make a central POL collection facility LCC effective. A study should be made to determine the most cost effective method of collecting and disposing used POL products. The segregation, collection, storage, recycling, and treatment of used POL products will be done in accordance with AR 200-1.

d. Recovery and recycling of used POL products will be maximized to protect the environment and conserve energy and natural resources. Closed-loop recycling, where used POL products are re-refined by a contractor and returned to the generator, is the preferred method of recycling. Used POL products may also be sold through a QRP where allowed by State law. Care should be taken to keep POL products of different sources and radically different properties separate to ensure homogeneous batches for turn-in. Handling, storage, and disposal practices will be environmentally safe and acceptable. Accidental discharges will be handled in accordance with AR 200-1 and the garrison Spill Contingency Plan (SCP).

e. The use of used POL products in Army heating plants will be in accordance with Public Law (PL) 94-163, the Code of Federal Regulations (40 CFR 266, subparts D and E), and AR 200-1.

Chapter 4

Water Supply and Wastewater

4-1. Water supply and wastewater policy

This chapter establishes policy and criteria for the operation, maintenance, repair, and construction of distribution, collection, treatment, and disposal facilities for water supply, wastewater, stormwater, and industrial waste.

a. Potable water will be supplied in accordance with the Safe Drinking Water Act (SDWA) of 1974 as amended in 19 June 1986 (PL 99-339) and in October 1988 by the Lead Contamination Control Act (PL 100-572) (42 U.S.C. 300f, et seq.) and all applicable State and local regulations. Sanitary control and surveillance of potable water supplies will be in accordance with AR 40-5 and TB MED 576 or applicable State and local regulations. Army garrisons that are Outside the Continental United States (OCONUS) and classified as suppliers of water will comply with the standards in the National Primary Drinking Water Regulation and the final governing standards issued by the DOD Executive Agent for the host nation concerned. The theater surgeon may approve OCONUS requests for deviation from the Continental United States (CONUS) drinking water standards. Requests will be submitted to the theater surgeon.

b. Treatment of wastewater and non-point source (NPS) pollution control and abatement will comply with the applicable parts of the Clean Water Act (CWA), as amended (33 U.S.C. 1251, et seq.), and AR 200-1, and AR 200-3. Measures for NPS pollution control will be included in all construction, garrison operations, and land management plans and activities.

c. Water supply and wastewater services will be provided at the lowest LCC consistent with garrison and mission requirements, efficiency of operation, reliability of service, and environmental considerations. The cost for these

services will be held to a minimum through comprehensive water resource planning, management, and an effective water conservation program.

d. Wastewater sludge disposal will be in accordance with section 405 of the Water Quality Act of 1987 (33 U.S.C. 1342 (p)).

e. Discharges of stormwater associated with industrial activities will be in accordance with section 402(p) of the Water Quality Act of 1987 (33 U.S.C. 1342(p)).

f. Prevention and control of surface and ground water pollution will be in accordance with AR 200-1 and AR 200-3.

g. Operation, maintenance, and repair of water supply systems and wastewater systems will be in accordance with Unified Facilities Criteria (UFC) 3-230-02, Operation and Maintenance Water Supply System and UFC 3-240-02N, Operation and Maintenance: Wastewater Treatment Systems Augmenting Handbook.

h. Design criteria and standards for water supply systems and for wastewater collection, treatment, and disposal systems will be in accordance with TI 800-01. Alteration and construction projects will be submitted for review by State regulatory authorities where required by law.

i. Maintenance and repair of road drainage facilities, including stormwater drains, will be in accordance with AR 420-72.

4-2. Federal, State, local, and host nation authorities

a. Army garrisons and activities will cooperate with Federal, State, local and host nation regulatory authorities in the supply of drinking water and in the control and abatement of surface and underground water pollution by wastewater discharges from Army garrisons and activities.

b. Army garrisons located in States that have underground injection control, wellhead protection, and sole source aquifer programs will comply with applicable State or local program requirements.

c. At OCONUS locations, Army garrisons commanders or activities will cooperate with host country regulatory agencies and will comply with the substantive standards that relate to the supply of drinking water and the control and abatement of surface and underground water pollution by wastewater discharges from Army garrisons or activities.

4-3. Water resource management

a. A Water Resource Management Plan (WRMP), as part of the IUMP, will be prepared for each garrison. The WRMP will include a water supply contingency plan for national or local emergencies (enemy attack, mobilization, subnormal service, main breaks, fires, and so forth). Contingency plans should be in accordance with American Water Works Association (AWWA) Manual No. 19, TB MED 576, and primacy State guidance.

b. The garrison WRMP will include an effective water conservation program that includes elements such as water re-use, water metering, and landscape management. Water meters will be provided in new construction in accordance with TI 800-01. Judicious placement of water consumption meters during major renovation or repair projects will provide data for water resource planning and conservation programs. The WRMP should be reviewed and updated, as required, with the Capital Investment Strategy in accordance with AR 210-20.

c. The garrison will maintain the data necessary to protect garrison water rights.

d. The use of computer modeling tools (such as Installation Water Resources Analysis and Planning System (IWRAPS)) is encouraged for analyzing and forecasting garrison water resource management requirements.

4-4. Public notification

a. Public notification is required by the Safe Drinking Water Act, as amended. A Public Notification Plan will be prepared for each garrison. The Public Notification Plan should be prepared in accordance with EPA 570/9-89-002. The DPW will coordinate the plan with the garrison Public Affairs Office, the IMA, and the Staff Judge Advocate.

b. A standing operating procedure (SOP) for alerting personnel in emergencies and clearly defining the duty of key individuals during the emergency should be prepared for each garrison.

c. Personnel and organizations connected to the garrison water supply will be notified of any actual or anticipated noncompliance with water quality standards. Noncompliance includes excessive contaminant levels as well as inadequate surveillance procedures or frequencies. Water supply personnel and organizations will be notified of all approved variations in water quality or exemptions to surveillance criteria. The Command Health Report (Requirement Control Symbol (RCS) MED-3) (see AR 40-5) should be used to report violations, variances, and exemptions through command channels to ATTN DASG-HS, THE SURGEON GENERAL, 5111 LEESBURG PIKE, FALLS CHURCH VA 22041-3258.

d. The Public Notification Plan and the SOP for alerting personnel should be reviewed annually and updated as needed.

e. All violations will be reported using the RCS DD-M(SA) 1485 (Environment Management by Objective (MBO)) report, and all projects required to correct violations of the SDWA or CWA as amended will use RCS DD-M(SA) 1383 (Environmental Protection Control Report).

4-5. Water supply and wastewater system maintenance

- a.* Accurate and complete water supply distribution system and wastewater collection system maps should be prepared and kept current.
- b.* Periodic inspections and preventive maintenance of water supply and wastewater disposal systems, storage tanks, and cathodic protection systems should be done in accordance with UFC 3-230-02, UFC 3-240-03N, and Air Force Manual (AFM) 85-5.

4-6. Engineered management systems

Management tools (such as W-PIPER) are available to identify infrastructure problems, define maintenance and repair requirements, and direct resources to maximize return on investment. The use of these tools for water supply and wastewater systems is strongly encouraged. Information and assistance can be obtained from the USACPW.

4-7. Water supply treatment and surveillance

a. Garrison commanders will provide facilities to disinfect water supplies in accordance with TB MED 576 and UFC 3-230-02. Commanders will comply with applicable parts of the Safe Drinking Water Act of 1974 (42 U.S.C. 300f, et seq.), as amended, or the FGS issued by the DOD Executive Agent for the host nation.

b. In coordination with the IMA, DPW personnel will disinfect new and repaired water mains, storage tanks, wells, and equipment in accordance with American Waterworks Association (AWWA) Standards AWWA C651-86, AWWA C652-86, AWWA C653-87, and AWWA C654-87, following construction, repairs, garrison of taps, or contamination situations.

c. Flush water distribution systems as necessary to remove accumulated debris in accordance with UFC 3-230-02. A systematic flushing plan of the water distribution lines must provide adequate scouring velocities.

d. The composition and recommended concentration of all additives, including those for corrosion or scale control, should be known and tested for on a regular basis.

e. Obtain approval from the IMA before any chemical additives are used in the potable water supply. Additives used in potable water supplies will be AWWA or National Sanitation Foundation approved.

f. The EPA has authority to grant individual States primary enforcement responsibility over Federal facilities. Army garrisons located within States that have been granted primary enforcement responsibility will comply with applicable requirements promulgated by State regulatory authorities. Army garrisons located within States without such primary enforcement responsibility will comply with applicable requirements promulgated by EPA.

g. Operational analysis (for example, turbidity) will be conducted in accordance with frequencies and methodologies specified in UFC 3-230-02 or as required by the regulatory authority in those States granted primacy.

h. Microbiological analysis will be conducted in accordance with applicable standards promulgated by the authority exercising primacy over the garrison. Samples should be collected and analyzed by State-certified technicians and laboratories. Garrisons are encouraged to apply to their respective regulatory authorities for certification of DPW laboratory facilities. The IMA is responsible for providing medical oversight (health risk), quality assurance, and technical assistance regarding water supplies. With respect to microbiological monitoring, the IMA will ensure that sampling and analysis is performed by a certified laboratory. This means the IMA may perform the compliance monitoring or provide oversight to another laboratory conducting the regulatory monitoring. In addition, the IMA may conduct random sampling and microbiological analysis of the garrison water supply as part of its oversight and quality assurance responsibility.

i. Chemical, pesticide, and radiological analysis will be conducted at frequencies prescribed in accordance with applicable parts of 40 CFR 141, State or local requirements, and TB MED 576. Data requested by regulatory authorities should be forwarded to the regulatory authorities in a timely manner. Copies of all analytical results for the potable water system should be submitted (including OCONUS garrisons) to the IMA for medical review/evaluation. The IMA is responsible for sending the results to ATTN MCHB-DE-W, US ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE, ABERDEEN PROVING GROUND MD 21010-5422, for the Army's Drinking Water Surveillance Program data base.

j. Tests should be conducted periodically to verify that disinfectant (for example, chlorine) residuals and corrosion and scale control additives are at the recommended concentrations to ensure adequate disinfection and to prevent corrosion. Periodic testing is required on both manual and automatic water treatment systems.

k. A cross-connection control program will be established at each garrison. Cross-connection control plans will be prepared to regulate those areas in the distribution system where potable water may come in contact with nonpotable water. The plan will list the existing and potential cross connections and develop a plan for the garrison of backflow prevention devices, as well as a schedule for testing, inspection, and maintenance. A routine inspection and maintenance program for backflow prevention devices performed by State certified personnel will include backflow prevention devices for those facilities that have the potential to contaminate the water supply system (for example, pest control shops, photographic laboratories, and medical facilities). Design, operation, and maintenance of cross-connection control components will be in accordance with UFC 3-230-02 and TB MED 576.

l. Adequate pressures will be maintained, measured, and recorded in distribution systems in accordance with primacy State requirements and UFC 3-230-02.

m. The USACPW can provide technical and operational assistance for water supply systems. The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) can provide technical support in resolving any drinking water treatment and distribution water quality concerns affecting consumer health. The USACHPPM maintains a laboratory certified by Federal and many State regulatory authorities for doing analyses to support specially requested services delineated in TB MED 576.

4-8. Wastewater treatment and surveillance

a. All discharges from Army garrisons or activities to municipal wastewater treatment facilities will comply with applicable pretreatment standards. The DPW will establish pretreatment standards for tenants on Army garrisons and for off-post facilities that discharge wastewater to the garrison wastewater treatment facilities.

b. Wastewater treatment plant effluent will be treated to meet National Pollutant Discharge Elimination System (NPDES) permit requirements.

c. Army garrisons will comply with requirements of the Federal Water Pollution Control Act of 1972 as amended by the Water Quality Act of 1987 (33 U.S.C. 1251, et seq.). All water quality monitoring (including toxicity testing) will be done in accordance with NPDES permit requirements. Technical assistance to help meet NPDES permit requirements is available from the USACPW, USACHPPM, or the U.S. Army Corps of Engineers supporting district.

d. Drains should not be used in close proximity to toxic or hazardous storage areas. Drains, where required, will be designed to retain accidental spills or be connected to a wastewater treatment facility capable of safely disposing of spilled materials.

e. Periodic inspections should be made of nondomestic wastewater sources (for example, laboratories, boiler plants, cooling towers, photographic developing facilities, oil/water separators, and other small treatment systems) to ensure that these wastes are being handled properly.

f. Pest control facilities will be in accordance with AR 200-5.

4-9. Water softening

a. Treatment facilities for softening of the water supply may be installed at fixed garrisons and activities if the hardness exceeds 200 parts per million (ppm), expressed as calcium carbonate (CaCO_3), and if the treatment facilities can be provided economically. Since portions of the Army community may require restricted sodium intake for medical reasons, garrisons installing sodium cycle ion exchange systems will notify the supporting IMA.

b. Softening to less than 100 ppm may be required for special purposes and services; however, treatment for corrosion control may also be required. Some of the special applications where this level of softening may be needed are laundries, hospitals, boiler plants, central food facilities, and so forth.

4-10. Scale and corrosion control

a. An effective corrosion control management program that includes water treatment for scale and corrosion and cathodic protection for water tanks and underground metallic structures will be maintained.

b. Scheduled water distribution system inspections should be made to observe, evaluate, and record scale deposits and deterioration caused by corrosion. Guidance provided in UFC 3-230-02 should be used for determining the adequacy of scale and corrosion control.

c. Adequate corrosion control will be performed to minimize lead and copper concentrations in first draw tap waters, if necessary, in accordance with Federal (40 CFR 141, subpart H), primacy State, or FGS requirements.

d. External surfaces that are in contact with soil and all internal surfaces of steel water storage tanks should be protected from corrosion by a cathodic protection system in accordance with the TI 800-01.

e. Metallic water supply and metallic wastewater collection lines should be bonded and coated in accordance with the TI 800-01. Corrosion protection of underground metallic water supply mains and wastewater collection lines will be in accordance with ETL 1110-3-404.

f. Cathodic protection systems should be inspected and maintained in accordance with National Association of Corrosion Engineers (NACE) standards RP 0169-92 and RP 0388-95. Cathodic protection system rectifiers should be tested on a monthly basis and the total system annually.

g. Assistance in establishing a chemical analysis program, determining corrective actions, or making recommendations for changes in treatment practices for more effective scale and corrosion control can be furnished by the USACPW.

h. Installation of nonstandard, untested, nonchemical devices that claim to soften water or reduce scale in water systems, heating and cooling systems, or boilers using magnet, electro-magnet, or similar devices are prohibited.

4-11. Terminal water supplies

The following precautions will be exercised to prevent potable water system contamination at Army garrison piers and docks:

a. Water connections from the potable water system to any vessel will be installed and operated under the supervision of the individual in charge of the garrison water system.

b. Connections from the garrison potable water system to vessels with power to operate fire pumps or other water pumps will be provided with approved backflow prevention devices.

c. Hose lines from the garrison potable water system may be carried or used for fire protection aboard any vessel, provided that no connection is made to the vessel water system and that the hose lines are so secured as to prevent discharge or submergence when they are not in use.

4-12. Metering

a. *Well water.* Drawdown or water-level testing gages will be installed in active deep wells to provide daily operating data for development of underground water supplies and determining pumping schedules.

b. *Purchased water (reference AR 420-41).* Purchased water will be metered to ensure accuracy of utility charges to the garrison.

c. *Sale of water.* Meters will be furnished, installed, and properly maintained by the purchaser to determine the quantity of water sold, and the purchaser will be billed accordingly. Where a permanent meter cannot be installed, the quantity of water delivered will be estimated and billed accordingly. Temporary metering will be installed periodically to more accurately estimate the consumption in heavy usage facilities.

d. *Operational control.*

(1) Water flow meters should be installed for operational control at the following locations:

(a) Each water supply well.

(b) Each source of surface water supply where chemical treatment is required.

(c) Each connection delivering water to any other garrison or Government agency, except as provided in paragraph c above.

(d) Each connection where water flow records are needed for planning and management purposes.

(e) Each connection where treated water supplied by a surface water treatment facility enters a distribution system.

(2) Electrical meters should be installed for operational control at water supply and wastewater treatment plants. The meters may be a watt-hour or other type of recording device (such as a timing element) to measure electrical energy used or to record the number of hours of pump operation.

e. *Major water users.* Major water users, such as boiler plants, large industrial users, and housing areas should be metered to provide data for water resource planning. Metering at other sites should be done as required to determine reimbursement costs, conservation benefits, or resource management data.

4-13. Swimming pools and natural bathing areas

a. Utility services, equipment operation, and operating supplies for nonappropriated fund operated pools will be furnished in accordance with AR 215-1.

b. The DPW is responsible for maintenance, repair, and alteration of installed swimming pool and natural bathing area equipment. The DPW is not responsible for the control of swimmers, cleaning of the pool, or janitorial services.

c. Operation, maintenance, and repair of swimming pools and natural bathing areas will be in accordance with and UFC 3-240-03N and TB MED 575.

Chapter 5

Energy Source Selection

5-1. Energy policy

This chapter prescribes policy and criteria for the selection and use of energy sources for the following purposes: for cooking, process equipment, and incineration and in heating systems, heating plants, and boiler plants to generate steam, hot water, or warm air at Army garrisons and activities. All generation, distribution, and use of fixed facilities energy and water will be done in the most efficient manner. The IUMP will show how energy conservation goals will be achieved.

5-2. Fuel selection

a. Energy sources will be selected with careful consideration of national reserves, local fuels availability, and LCC analysis. Use of renewable energy sources (waste products, solar, wind, geothermal, refuse-derived fuel (RDF), and wood) is encouraged. Special consideration will be given to the use of coal, in accordance with 10 U.S.C. 2690, where its use is LCC effective.

b. The energy source selected for new heating systems, or for fuel conversions, will be the most LCC effective fuel available for that system. The economic analysis of both in-house and privately funded alternatives will include economic assumptions used to perform the evaluations. A sensitivity analysis, comparing the effects of changes in

initial investment and operating costs, will be included to enable reviewing officials to fully evaluate how changes in assumptions affect the project's viability.

c. Large central plants will be designed with multiple fuel capability where LCC effective.

d. The minimum supply of the backup fuel will be determined by the garrison DPW. Local conditions and ready availability of fuels for emergency situations will be the criteria used to determine the quantities required for on-site storage.

5-3. Solid fuels

This section establishes policies and procedures to ensure solid fuels (anthracite, bituminous, sub-bituminous, and lignite coal) are of the technical quality required to meet the needs of Army power and heating plants.

a. *Coal and solid fuel specifications.* The DPW will ensure that coal requirements are correctly estimated; analytical and size specifications are technically adequate for power and heating plants; solid fuels accepted meet specifications or when they do not meet specifications, appropriate action is taken; and solid fuels are handled and stored properly to minimize degradation.

b. *Inspection, sampling, and receipt of solid fuels.*

(1) Solid fuels received at a garrison will be visually inspected and samples taken by a qualified coal sampler who has been certified for proficiency by USAPC. Inspections will be accomplished in accordance with TM 5-675. Samples will be collected and prepared in accordance with TB ENG 249. The name of the individual performing the inspection and sampling and the individual's Certificate of Proficiency Number will be placed in the appropriate space on DD Form 250 (Materiel Inspection and Receiving Report).

(2) Appropriate records reflecting the quality of solid fuels accepted will be maintained for 1 year.

c. *Operating procedures and equipment.* Solid fuels operating procedures and equipment descriptions and usage are described in TM 5-675. Solid fuels handling equipment and conveyor trucks are classified as special design items and will be obtained in accordance with AR 420-18. The DPW is responsible for maintenance and repair of motor truck or platform-type scales at coal yards, that are exclusively for weighing solid fuel.

5-4. Permanently installed petroleum product storage, distribution, and dispensing systems

a. *Petroleum product storage, distribution, and dispensing system policy.*

(1) This section prescribes policies, criteria, and responsibilities for the maintenance and repair of fixed petroleum product storage, distribution, and dispensing systems such as pipelines, pumping stations, bulk and operating storage, service stations, and aircraft fueling facilities. Petroleum product storage, distribution, and dispensing systems will meet national pollution emissions requirements and applicable State and local requirements.

(2) Adequate maintenance will be provided to ensure maximum safety and efficiency, economical operation, and normal life expectancy of the equipment. The using organization is responsible for preventive and minor maintenance and operation of facilities for the storage, dispensing, and distribution of liquid petroleum products.

(3) The extremely hazardous nature of petroleum products and potential environmental impact resulting from system failures requires that a repair and construction hazard analysis be made to determine the degree of risk associated with maintenance and repair deferral (see AR 385-10). Risk assessment codes will be assigned and hazardous situations eliminated on a "worst-first" basis.

(4) Tanks will be cleaned, maintained, and cathodically protected in accordance with industry practice and applicable safety standards (National Fire Protection Association (NFPA) Standard No. 327, American Petroleum Institute (API) publication Recommended Practices (RP) 2015). Fuel tanks not needed will be removed and disposed of in accordance with local, State, and national laws and governing regulations.

b. *Hazards.*

(1) Toxic, fire, and explosive hazards of petroleum products will be brought to the attention of personnel concerned with the operation and maintenance of these facilities.

(2) Patching or hot-work on POL tanks will be done under the supervision of individuals who understand the potential for fire and explosion, assisted by workers sufficiently skilled to carry out the necessary operations safely, the work will be started only after the characteristics of the previous contents of the tank or container have been determined. National Fire Protection Association (NFPA) and American Petroleum Institute (API) publications provide guidance for the safeguarding of tanks where patching or hot-work is proposed.

c. *Inactive installations.* Processing and maintaining permanently installed petroleum products storage, distribution, and dispensing systems at inactive installations and sections of these systems not required for current operations. will comply with present legislation and Army policy (EPA and AR 200-1) regarding this potentially hazardous issue. Note: this rewording is due to the rescinding of AR 20-17 and does not change policy or procedure.

Chapter 6

Heating Systems

6-1. Heating system policy

This chapter establishes policy and criteria for the efficient and economical operation, maintenance, repair, and construction of facilities and systems for boiler plants; space heating systems; domestic water heating systems; and systems used for distribution of fuel gas, steam, hot water, and process equipment.

a. The type, number, and size of heating units or plants to be used for a new or conversion facility will be based on a thorough evaluation of the heating requirements for the anticipated life of the buildings to be constructed and served. Consideration will be given to interconnecting existing central plant systems or large building systems to supply new building requirements.

b. Design and construction of these facilities will be in accordance with applicable parts of the TI 800-01.

c. Operation, maintenance, and repair of these facilities will be in accordance with the manufacturer's instructions for specific equipment. Additional information on the operation, maintenance, and repair of these facilities is contained in TM 5-642, TM 5-643, TM 5-644, TM 5-646, TM 5-650, TM 5-651, TM 5-678, and TM 5-745.

d. All fuel-burning facilities will meet national pollution emissions requirements and applicable State and local requirements.

e. Garrisons will establish effective corrosion control programs to include the following:

- (1) Inspection of utilities plants, systems, and structures to determine the cause of any failures.
- (2) Utilization of corrosion-resistant materials in replacement and new garrisons where LCC effective.
- (3) Procedures for the proper operation and maintenance of cathodic protection systems. Guidance for corrosion control can be obtained from TM 5-811-4 and TM 5-811-7. The USACPW can provide assistance in developing corrosion-control programs.

f. The DPW will review and approve all proposed connections, extensions, alterations, or attachments to a building's heating system.

6-2. Space heating temperature standards

a. Space heating temperature standards will be in accordance with the AR 11-27.

b. Heating is not permitted in warehouse sections that do not contain material or equipment requiring protection from freezing or from condensation and where warehousing of stored goods is the only operation.

c. Heated makeup air may be provided for process rooms, paint shops, drying rooms, dining facilities, and the like. The quantity of outside air to be heated and temperature to be maintained will be in accordance with the TI 800-01.

6-3. Boiler and heating plants—operation, maintenance, and safety

a. Boiler and heating plants will be operated and maintained in a safe and efficient manner.

b. The length of the heating season for providing heat to facilities for personal comfort will be determined by the garrison commander, based on local conditions.

c. Central boiler and heating plant and building mechanical room equipment, outside distribution systems, and the main distribution systems in buildings will be marked with color banding and/or titles in accordance with ANSI Standard 13.1.

d. All high-pressure steam boilers (above 15 psi) and all high temperature water (HTW) boilers (above 250 degrees Fahrenheit (°F) temperature) in active use will be inspected in accordance with the Code of Boiler and Pressure Vessel Inspectors (BPVI) and the American Society of Mechanical Engineers. Inspections must be performed by persons certified in accordance with BPVI standards. The recommendations of these safety inspections will be reviewed and appropriate actions taken to correct deficiencies.

e. Gas- or oil-fired heating units may be equipped with automatic controls and firing systems and safety devices that will require minimum operational surveillance.

f. Constant operator attendance in large central steam boiler plants and high temperature water systems, and large automatic commercial building type systems will be established by the garrison, based on the local requirements. If roving plant operators are used, operational visits will be of a duration required to observe a complete cycle of operation and perform the scheduled operator preventive maintenance. Criteria for staffing should be the following: criticality of service; size and complexity of the equipment; extent of the maintenance responsibility required by operators; whether "in plant" maintenance is used; the availability of local shop support; and plant location. The critical factors in determining staffing requirements will be the safe, efficient and reliable operation of the equipment.

6-4. Boiler water treatment

a. Boiler water and steam distribution systems will be treated in accordance with TM 5-650. Only those chemicals identified in TM 5-650 and in this regulation will be used. Other chemicals will not be used without approval from USACPW (CECPW-ES).

b. Contracts with third-party chemical suppliers should include provision for appropriate steam, condensate, and

water treatment to ensure that the Army distribution systems and end-use facilities are not at risk from the use of the chemically treated energy medium.

c. Installations will submit a minimum of one boiler water and one condensate sample from high-pressure plants each month for boiler water quality assurance analysis. Boiler water quality assurance services are available through USACPW contracts. Garrisons will follow the boiler water sampling schedule outlined in TM 5-650.

d. Overseas commands may use the USACPW boiler water analysis services when desirable. Overseas commands not using this service will establish procedures for local performance of similar surveillance services.

e. Garrisons with high pressure steam boilers will use at least one condensate corrosion tester per high pressure boiler per year.

6-5. Corrosion control

a. Condensate return line corrosion will be held to a minimum by using deaeration and dealkalizing equipment, where their garrison is economically justified. Where this is inadequate or not economically justified, an amine-type treatment will be used. The amines (neutralizing type), cyclohexylamine, diethylaminoethanol (DEAE), or morpholine will be selected and used in accordance with TM 5-650.

b. Steam treated with chemicals will not be used directly for humidification or cooking purposes. A heat exchanger will be installed to provide chemical-free steam at these locations.

6-6. Domestic hot water supply

a. Water heating and storage tank capacities will be in accordance with TI 800-01.

b. Hot water supply systems will be operated to provide water at the points of use and with temperatures as follows:

(1) Automatic dish washing in food service facilities: 140°F. Final rinse for dishes and utensils in all food service applications: 180°F.

(2) Child care centers: See AR 608-10 for water temperature requirements for child-occupied spaces.

(3) Commercial type laundries: 180°F.

(4) Administrative and other facilities: 110°F. maximum.

c. Where a two temperature or multiple temperature water supply is needed in food service or medical and laboratory facilities, lower temperature source generators with "boosters" to the higher temperatures in close proximity to the point of use will be used to the maximum extent practical. The storage and distribution of water above 150°F with distribution and blending to lower temperatures at point of use is not permitted.

6-7. Safety devices

a. Boilers, furnaces, water heaters, unfired pressure vessels and tanks, gas storage, and distribution systems are generally equipped with the safety devices necessary to protect the equipment against damage and prevent hazards to life and property. These devices (temperature- and pressure-relief valves, low-water cutoffs, safety water feeders, limit controls, and similar devices) will be well maintained and tested in accordance with the manufacturer's recommendations to assure proper operation.

b. Pressure relief or safety valves on low pressure steam or hot water boilers will only be adjusted by a boiler inspector or other qualified plant personnel. Where changes are made in the type of fuel or firing equipment, the safety relief or relief valve capacity will be verified for adequacy under the new conditions.

c. Safety valves and devices for both low- and high-pressure boilers will be in accordance with sections I and IV of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. At OCONUS garrisons, host nation standards or ASME codes, whichever are more stringent, will be followed.

6-8. Gas distribution systems

a. Gas distribution systems on Army garrisons will be designed, installed, inspected, operated, and maintained in accordance with 49 CFR 192 and the Department of Transportation Guidance Manual for Operators of Small Gas Systems. Technical information is provided in Corps of Engineers Guide Specification (CEGS) CEGS-02685, CEGS-15488, and TM 5-654.

b. Each garrison owning a gas distribution system will prepare an operations and maintenance plan and an emergency plan, as specified in 49 CFR 192, subpart L. Paragraphs on reports required by the Department of Transportation are not applicable to Army owned gas distribution systems. If the garrison gas distribution system is not Army owned, the garrison will coordinate with the appropriate authorities to assure that the gas distribution system is being operated and maintained in accordance with 49 CFR 192 and that emergency plans have been coordinated and integrated with appropriate Army organizations.

6-9. Heat distribution systems

a. Heat distribution systems for 201°F and above will be designed in accordance with TM 5-653 and TM 5-810-17 and will be selected in the following order of preference:

(1) Above ground.

(2) Shallow concrete trench.

(3) Direct buried.

b. Direct buried systems will only be used where aesthetics or functional requirements preclude the use of above ground or shallow concrete trench systems (for example, where the water table is above the bottom of the trench). Buried Class A sites will use pre-approved drainable, dryable, air pressure testable steel conduit systems.

Chapter 7

Air conditioning and refrigeration

7-1. Air conditioning and refrigeration policy

This chapter establishes policies, procedures, and responsibilities for mechanical refrigeration and space conditioning systems in new and existing facilities. Space conditioning may include air conditioning, evaporative cooling, dehumidification, or mechanical ventilation equipment.

7-2. Air conditioning criteria

a. Air conditioning requirements for comfort cooling will be evaluated and approved by the garrison commander based on local conditions.

b. Space conditioning temperature standards will be in accordance with AR 11-27.

c. Design and construction criteria of space conditioning equipment will be in accordance with TI 800-01.

d. Heat pumps may be air source, water source, or ground- coupled type and will be certified under the Air Conditioning and Refrigeration Institute (ARI) Heat Pump Certification Program.

e. Operation, maintenance, and repair of air conditioning, evaporative cooling, dehumidification, and mechanical ventilation equipment will be performed by certified technicians and will be in accordance with TM 5-671.

7-3. Occupant-owned equipment

a. Army policy is to provide Government furnished air conditioning to eligible facilities in lieu of occupant- or resident-owned equipment. However, where funds are not available and the facility is eligible for air conditioning, the garrison commander may authorize garrison of occupant-owned air conditioning units. Installation will be at the expense of the occupant or resident.

b. At Government expense, the DPW may install a 120/240-volt receptacle of the proper current rating for the unit. In OCONUS garrisons, an equivalent receptacle suitable for the local voltage will be used.

c. The occupant or resident is responsible for the garrison, maintenance, repair, and eventual removal of the unit.

7-4. Donated units

Army policy is to provide Government furnished air conditioning to eligible facilities in lieu of donated units. However, where funds are not available and the facility space is eligible for air conditioning, the garrison commander may approve air conditioning units donated for specific use in medical facilities if they are given by private individuals and non-Government groups (for example, veterans organizations and fraternal groups). Donations will be in accordance with AR 1-100 and 10 U.S.C. 2601.

7-5. Central air conditioning plant

The decision to use a large central refrigeration plant with distribution system or multiple units with no associated distribution system will be made locally, based on garrison-specific requirements. The system selected will be the most LCC effective system that provides safe and reliable service to meet user needs. Critical facilities (for example, communication or computer areas) that require year-round air conditioning may require special consideration. When this type of equipment is served by a central plant, it may be provided with an auxiliary system to serve the critical smaller load when the central plant is shut down or otherwise would not be needed.

7-6. Refrigeration

a. This section defines garrison and maintenance policy for mechanical refrigeration equipment used for, but not limited to, the following applications:

(1) Reach-in, walk-in, and domestic refrigerators.

(2) Cube and flake ice machines.

(3) Ice cream cabinets.

(4) Water coolers.

(5) Ice manufacturing plants.

(6) Refrigerated storage plants.

(7) Frozen storage plants.

- b. Projects for refrigeration equipment will be designed in accordance with TI 800-01.
- c. Refrigeration equipment, refrigerated warehouse facilities, and frozen storage plants will be installed, operated, and maintained in accordance with industry standards or TM 5-670 and TM 5-671.
- d. Automatic control and alarm devices should be provided for all warehouse-type refrigeration equipment. Only manual reset controls will be used for high-pressure-shut-off controls.
- e. In refrigerated warehouse facilities, temperatures will be in accordance with the ASHRAE Handbook of HVAC Systems and Applications. These temperatures should be maintained on a continuous 24-hour basis. Equipment is shut off only when necessary for repairs. In central meat-cutting plants, temperatures will be in accordance with the ASHRAE Handbook of HVAC Systems and Applications. Alterations or additions to any system will not be made that permit temperatures lower than those specified in the design as finally approved.
- f. Both an indicating thermometer and a temperature recorder should be provided for each refrigerated storage space and each frozen storage space greater than 1,000 cubic feet. Charts for the temperature recorder will be for at least 24 hours but not more than 1 week (7 days). These charts should be retained for a minimum of 6 months.

Chapter 8 Electric

8-1. Electric systems operation, maintenance, repair, and construction

This chapter establishes policy and criteria for purchased electrical power, electric power generation plants, auxiliary electric power generators, and the control and distribution of electrical power.

- a. Garrison electrical facilities and equipment will be in accordance with TI 800-01. At garrisons where privatization is being considered, exterior electrical equipment should be compatible with local utility company design, construction, garrison, and maintenance standards and criteria.
- b. Maintenance and repair will be in accordance with National Fire Protection Association (NFPA) 70B, TM 5-683, TM 5-684, TM 5-685, and TM 9-1300-206. Safety procedures described in NFPA 70E, TM 5-682, EM 385-1-1, and the National Electrical Safety Code (NESC) will be followed while performing maintenance and repair.
- c. As part of the IUMP, an garrison power system analysis will be conducted at least every 5 years or sooner if major changes have been made. The analysis will include—
 - (1) Load flow analysis, including the projected loads for the next 5 years.
 - (2) Fault study.
 - (3) Protection coordination study.
 - (4) Power factor correction study.
- d. Lightning protection systems will be installed, maintained, and tested in accordance with TM 5-811-3, TM 9-1300-206, and Military Handbook (MIL HDBK) 419A. Lightning protection systems will be installed on explosives storage and handling facilities as specified in AR 385-64 and TM 9-1300-206. Lightning protection systems will be installed on command, control, communication, and computer facilities or other facilities containing high-value electronic equipment.

8-2. Electrical supply standards

The following electrical supply standards apply to Army garrisons:

- a. Garrisons will purchase electric power from utility companies in the most LCC effective manner. Installation reliability requirements may be accomplished by using multiple utility company feeders, auxiliary generators, or a combination of both. The garrison should purchase electric power at the highest available voltage.
- b. Electrical power will be supplied to the user at the standard utilization voltage, or the applicable standard when a choice is available. The following guidance applies:
 - (1) Supply electric power at a voltage that is within +/- 5 percent of nominal voltage. Voltage-correcting equipment will be installed only when the user's equipment will not function acceptably at the utility supplied voltage range. Voltage-correcting equipment will be installed and maintained by the user to meet specific equipment requirements.
 - (2) Install and maintain power conditioning equipment to eliminate harmonics and other abnormalities when required for proper operation of installed equipment.
 - (3) Capacitors (static condensers) should be installed for power factor compensation (correction) when the cost of garrison can be amortized within 10 years. To avoid any possible harmful effects of a leading power factor, install automatic switching whenever a leading power factor could exist under some load conditions.
- c. Electrical power will be supplied at the frequency available from the electricity supplier. Frequency converters to supply another frequency will be installed and maintained by the user to meet specific equipment requirements.
- d. Equipment proponents will check with the DPW concerning the electrical characteristics available on the garrison before procuring electrical equipment or equipment having electrical components.

8-3. Exterior electrical systems

- a. Transmission and distribution line guidance follows.
 - (1) *Overhead lines.* Exterior lines will be installed overhead except as noted in (2) below. Wood poles and other wood members of the overhead distribution system will be treated with a preservative as specified in TM 5-684.
 - (2) *Underground lines.* Underground lines may be installed when they are LCC effective or where overhead lines—
 - (a) Could result in hazard to life or property.
 - (b) Interfere with other facilities.
 - (c) Are impractical, as in congested areas.
 - (d) Would be unsightly, as determined by garrison architectural and design guides.
 - (e) Would enhance distribution system reliability.
- b. Underground lines will be installed at security perimeter fence crossings, at storage or operating facilities for nuclear weapons and components, and at other sensitive security areas.
- c. Installation of equipment (such as primary junction boxes, circuit breakers, or transformers) in manholes and underground vaults will be avoided, except at airfields where clearance is required.

8-4. Lighting

The most LCC effective light sources that meet user requirements will be used.

- a. Where required by the National Electrical Code (NEC) or the Life Safety Code, emergency lights will be permanently connected to the electrical system, without the use of attachment caps and receptacles.
- b. Red identification lights will be installed on poles and other supports carrying exterior fire alarm boxes.
- c. The DPW will maintain and repair the following:
 - (1) Obstruction lights and their supply systems on buildings and other structures except communications towers.
 - (2) Security and aviation lighting and their supply systems (see FM 19-30).
 - (3) Interior storage battery-type automatic emergency lights, both unit and central battery-type.

8-5. Communications facilities

Communications equipment classified as equipment in place is not the responsibility of the DPW. (See DFAS-IN 37-100.) The DPW will maintain and repair the following communications-related items:

- a. Footings for communications poles and for communications towers.
- b. Poles and towers used jointly for power and communications.
- c. Underground duct lines used for power and communications (either separately or jointly owned). This includes manholes, handholes, pull boxes, and other similar access points that are parts of the underground duct lines.
- d. The use of a common envelope or trench, or adjoining manholes, handholes, pull boxes, or similar access points with one or more common walls without openings, as specified in TM 5-811-1, is encouraged. Do not install power and communications cables in the same conduit or access point.

8-6. Grounding facilities

The DPW will—

- a. Maintain, repair, and test grounds and grounding systems for real property. The user will install, maintain, repair, and test grounds and grounding systems for other than real property carried on DPW records.
- b. Test grounds and grounding systems in accordance with TM 5-684, TM 9-1300-206, and the NEC.
- c. At all U.S. Army Intelligence and Security Command (INSCOM) and U.S. Army Information Systems Command (USAISC) facilities, ensure that any changes to grounding systems are in accordance with the guidance contained in Military Standard (MIL-STD) 188-124A and Military Handbook (MIL HDBK) 419A.

8-7. Electronic security systems

- a. Electronic security systems will be in accordance with TM 5-853-4. The Intrusion Detection Systems (IDS) Mandatory Center of Expertise (MCX), U.S. Army Engineering and Support Center (CEHNC), Huntsville, AL, is available to provide assistance. The garrison of commercial IDS should be coordinated with the responsible provost marshal or physical security office as specified in AR 190-13.
- b. The DPW will furnish and install the following:
 - (1) A dedicated power circuit in conduit to the system control unit.
 - (2) A conduit (or other raceway) for signal conductors within the structure from the protected area to a maximum of 5 feet outside the structure.
 - (3) Conduit connecting the system components.

8-8. Auxiliary generators

- a. *Emergency and standby generators.* This section applies to generators, regardless of type, which are classified as installed equipment (real property). Emergency and standby generators will be installed in accordance with the

provisions of NFPA 70. As defined in NFPA 70, optional standby generators will be provided to support authorized facilities or activities when approved by the garrison commander.

b. Operations and maintenance. The DPW will operate, maintain, repair, and test auxiliary generating units that are classified as real property on DPW records in accordance with manufacturer recommendations.

8-9. Uninterruptible power supply units

a. Authorized uninterruptible power supply units. This section applies to uninterruptible power supply (UPS) units, regardless of type, that are installed equipment (real property). Uninterruptible power supply units are authorized only for the support of critical electronic, automatic data processing, and communications equipment that requires continuous electrical power for proper operation.

b. Operations and maintenance. The DPW will operate, maintain, repair, and test UPS units that are classified as real property on DPW records in accordance with manufacturer recommendations.

8-10. Prime Power Program

The Prime Power Program (PPP) loans 750 kW and 1,500 kW generators and 4.5 mW plants for use in emergencies or for other needs, such as peak shaving. Send requests for loans or information to ATTN CECPW-M-LP, US ARMY CENTER FOR PUBLIC WORKS, 7701 TELEGRAPH ROAD, ALEXANDRIA VA 22315-3862. Include all pertinent data concerning the use of the equipment and personnel required, as specified in AR 700-128.

Chapter 9

Food Service and Related Equipment

9-1. Food service and related equipment policy

This chapter establishes policy and criteria for the efficient and economical operation, maintenance, repair, and construction of food service facilities and related equipment.

a. Equipment used for the removal of vapors, grease, and heat from commercial cooking equipment will comply with the NFPA Standard 96. Personnel who perform maintenance and repair on both the commercial and family housing type cooking equipment will become thoroughly familiar with the NFPA Standard 96.

b. Gas fired food services equipment will be in accordance with NFPA Standard 54, The National Fuel Gas Code.

c. Design and construction criteria for food service and related equipment will be in accordance with TI 800-01.

d. Energy conservation and improved energy efficient equipment for food service and related equipment will be in accordance with AR 11-27.

e. The use of raw (direct contact) steam for heating food and hot water is not permitted. A steam-generating heat exchanger will be installed where steam is used for direct cooking or where any contact with food is possible.

9-2. Responsibilities for food service equipment

a. The U.S. Army Quartermaster Center and School (USAQMC-S) is responsible for the Army Food Service Program (AR 30-22), except for hospital and nonappropriated fund dining facilities. The USAQMC-S will assist in planning, reviewing, and justifying programs for military construction, minor construction, operations and maintenance, space allocations, and functional equipment layouts and criteria. The USAQMC-S will recommend authorization criteria and type-description for troop support equipment. Common table of allowances (CTA) 50-909 prescribes allowances for food service and related equipment for dining facilities, Army vessels, fire stations, air and crash detachments, hospital food service facilities, and other appropriated fund facilities.

b. The DPW is responsible for—

(1) Installing, removing, and providing scheduled maintenance (other than operator maintenance) and repair for all food service and related equipment in accordance with TM 5-636 or the equipment manufacturer's manuals. Maintenance and direct support schedules will be established in accordance with the equipment manufacturer recommendations.

(2) Initially training food service personnel in operation and operator (first echelon) maintenance of all new installed food service equipment.

(3) Making the final determination of repairability for equipment replacement. Upon determining that the equipment is not economically repairable, the DPW, in coordination with the food adviser, will specify in writing the basis for the decision. The signed written statement that equipment is uneconomically repairable will be provided through the garrison food advisor to the appropriate garrison supply activity as the basis for requisitioning the equipment.

(4) Providing cost data on repairs to equipment (parts and labor) to the garrison food advisor when required.

9-3. Requisitions for replacement or acquisition

Requisitions for food service and other related equipment will be coordinated with the DPW to ensure that proposed

equipment is compatible with available space and utilities and that energy efficiency has been considered in the equipment selection. The DPW will certify that funds are or will be made available for removal and garrison of equipment. The requisitions will reflect minimum essential requirements within the prescribed allowances (CTA 50–909) and follow procedures as prescribed for new and replacement equipment in AR 30–22.

9–4. Grease interceptors

a. Food service personnel are responsible for cleaning grease interceptors located within a dining facility. The DPW is responsible for monitoring the operation, maintenance, cleaning, and repair of outside grease interceptors. The DPW will establish guidelines for the disposal of materials from cleaned traps. Designated containers will be made available and truck-mounted sludge disposal tanks used whenever possible. Residue will be disposed of in accordance with procedures established by the DPW. The repair of grease interceptors is a DPW function.

b. Grease interceptors will not be installed on drainage piping from garbage grinders, nor are they required in hospital ward serving kitchens or floor pantries.

9–5. Ventilation hoods in dining facilities

a. Ventilation hoods and ductwork will be provided to capture and discharge vapor to the outdoors and recover energy from all conditioned discharge air where cost effective.

(1) Systems that serve cooking equipment such as ranges, deep-fat fryers, griddles, tilting fry pans, woks, ovens, steam jacketed kettles, and toasters (grease-laden vapor producers) will use corrosion-resistant materials and be designed and installed in accordance with NFPA Standard 96.

(2) Systems that exhaust saturated air (water vapor) from equipment such as dishwashers, pressure cookers, coffee urns, steam hot food tables, pot and pan sinks, and are separate from the systems handling grease-laden vapors, will use corrosion-resistant ducts and hoods and will be in accordance with NFPA Standard 90A.

(3) Clean out opening locations and construction details as well as electrical requirements and fire safety features will be in accordance with NFPA Standard 96.

(4) Installed ventilation hoods and related parts will be cleaned in accordance with NFPA Standard 96, chapter 8. Ducts will be cleaned as required, depending on severity of system use and grease accumulation, using resources available to the DPW or by commercial contract as determined locally. Food service personnel are responsible for cleaning filters and areas of the exhaust system up to the filters.

b. Hood construction requirements and details and guidance concerning other aspects of food service facility design, including that for family housing kitchen equipment, will be in accordance with TI 800–01 and TB MED 530.

Chapter 10 Reports and Records

10–1. Reporting

All installations will comply with the monitoring and reporting requirements established by applicable Federal, State, and local laws and regulations. (DA Form 2788 and AR 420–16 have been obsolete since 1999 with no replacement available.)

10–2. Solid waste records

The forms listed below are used to record data on solid waste activities. These forms are available through Army publications channels.

a. *DA Form 3916 (Daily Log of Truck Trips for Refuse Collection and Disposal)*. Entries recording refuse weight (tons) will be made daily by collection truck drivers. All entries will be totalled monthly on DA Form 3917 (Refuse Collection and Disposal) by collection supervisors.

b. *DA Form 3917 (Refuse Collection and Disposal)*. Quantities of refuse collected and disposed will be reported in units of weight (tons) (see TM 5–634).

10–3. Water and wastewater records

a. *Number, kind, and frequency of records*. The minimum number, kind, and frequency of water supply and wastewater operating tests and records required for completion of the DPW Operating logs, DA Form 4141 (Facilities Engineering Operating Log (Water—General)), DA Form 4374 (Repairs and Utilities Operating Log (Water—Supplementary)), DA Form 4247 (Facilities Engineering Operating Log (Sewage—General)), and DA Form 4178 (Facilities Engineering Operating Log (Sewage—Supplementary)) should be accomplished in accordance with the schedules shown in TM 5–662, UFC 3–230–02, and UFC 3–240–03N. Reasonable requests by regulatory authorities to review specific operating records will be honored.

b. *Army drinking water surveillance program data*. Army garrisons should provide copies of all drinking water

regulatory compliance data to the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) to be included in the Army Drinking Water Surveillance Program data base.

10-4. Heating plant records

Operating logs will be maintained for each high pressure boiler plant to monitor and review the plant's critical parameters and boiler water treatment procedures in accordance with TM 5-650.

Appendix A References

Section I Required Publications

a. Government.

(1) *Statutes.* Copies of these statutes may be found in a legal office or law library compiled under “United States Code.”

Energy Policy and Conservation Act

PL 94–163. (Cited in para 3–8*e*.)

Federal Water Pollution Control Act (FWPCA)

As amended by Clean Water Act of 1977 and the Water Quality Act of 1987 (33 U.S.C. 1251, et seq.). (Cited in paras 4–1*b*, 4–1*d*, 4–1*e*, and 4–8*c*.)

General Gift Funds

10 U.S.C. 2601. (Cited in para 7–4.)

Lead Contamination Control Act of October 1988

PL 100–572. (42 U.S.C. 300*f*, et seq.). (Cited in para 4–1*a*.)

Military Construction Codification Act

PL 97–214. (Cited in paras 3–2*c*(2) and 3–3*h*.)

National Environmental Policy Act (NEPA)

(42 U.S.C.A. 4321, et seq.) (Cited in para 3–1*a*.)

Resource Conservation and Recovery Act (RCRA) of 1976

42 U.S.C. 6901, et seq. (Cited in para 3–1*a*.)

Restriction on Fuel Sources for New Heating Plants

10 U.S.C. 2690. (Cited in para 5–2*a*.)

Safe Drinking Water Act

As amended (19 June 1986 (PL 99–339)). (Cited in paras 4–1*a*, 4–4*a*, and 4–7*a*.)

40 CFR 141

National Primary Drinking Water Regulations. (Cited in paras 4–7*i* and 4–10*c*.)

40 CFR 143

National Secondary Drinking Water Regulations. (Cited in para 4–1*a*.)

40 CFR 257

Criteria for Classification of Solid Waste Disposal Facilities and Practices. (Cited in para 3–6*a*.)

40 CFR 258

Criteria for Municipal Solid Waste Landfills. (Cited in paras 3–1*d* and 3–6*a*.)

40 CFR 260

Hazardous Waste Management System: General. (Cited in Glossary.)

40 CFR 266

Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities. (Cited in para 3–8*e*.)

40 CFR 279

Standards for the Management of Used Oil. (Cited in para 3–8*a*.)

49 CFR 192

Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards. (Cited in paras 2-4*b*, 6-8*a*, and 6-8*b*.)

Air Force Manual (AFM) 85-5

Maintenance and Operation of Cathodic Systems. (Cited in para 4-5*b*.)

AR 1-100

Gifts and Donations. (Cited in para 7-4.)

AR 11-18

The Cost and Economic Analysis Program. (Cited in para 2-2*h*.)

AR 11-27

Army Energy Program. (Cited in paras 2-2*d*, 6-2*a*, 7-2*b*, and 9-1*d*.)

AR 30-22

The Army Food Service Program. (Cited in paras 9-2*a* and 9-3.)

AR 40-5

Preventive Medicine. (Cited in paras 3-1*b*, 4-1*a*, 4-4*c*, and 4-7*k*.)

AR 40-61

Medical Logistics Policies and Procedures. (Cited in para 3-1*b*.)

AR 190-13

The Army Physical Security Program. (Cited in para 8-7.)

AR 200-1

Environmental Protection and Enhancement. (Cited in paras 2-2*c*, 3-3*j*, 3-8*a*, 3-8*d*, 3-8*e*, 4-1*b*, 4-1*f*, 5-4*c*, and 6-1*d*.)

AR 200-3

National Resources - Land, Forest, and Wildlife Management. (Cited in paras 4-1*b* and 4-1*f*.)

AR 200-5

Pest Management. (Cited in paras 3-6*b* and 4-8*f*.)

AR 210-20

Real Property Master Planning for Army Installations. (Cited in paras 2-2*f* and 4-3*b*.)

AR 210-50

Housing Management. (Cited in para 2-2*e*.)

AR 215-1

Morale, Welfare, and Recreation Activities and Nonappropriated Fund Instrumentalities. (Cited in paras 2-2*e*, 3-3*i*, and 4-13*a*.)

AR 385-10

Army Safety Program. (Cited in paras 2-3 and 5-4*a*(3).)

AR 385-64

U.S. Army Explosives Safety Program. (Cited in para 8-1*d*.)

AR 415-15

Army Military Construction Program Development and Execution. (Cited in para 2-2*b*.)

AR 420-10

Management of Installation Directorates of .Public Works (Cited in paras 2-2*a* and 2-2*b*.)

AR 420-18

Facilities Engineering Materials, Equipment and Relocatable Buildings Management. (Cited in paras 3-1*c* and 5-3*c*.)

AR 420-41

Acquisition and Sales of Utilities Services. (Cited in paras 2-2*e* and 4-12*b*.)

AR 420-72

Transportation Infrastructure and Dams. (Cited in para 4-1*i*.)

AR 420-90

Fire and Emergency Services. (Cited in Summary of Change.)

AR 608-10

Child Development Services. (Cited in para 6-6*b*(2).)

AR 700-128

Prime Power Program. (Cited in para 8-10.)

CTA 50-909

Field and Garrison Furnishings and Equipment. (Cited in paras 9-2*a* and 9-3.)

Defense Energy Program Policy Memorandum

Private-Sector Financed Defense Energy Contracts (Third- Party Contracting for Energy—10 U.S.C. 2394). (Cited in para 2-1*c*.)

DFAS-IN 37-100

Finance and Accounting Policy Implementation. (Cited in paras 3-3*g* and 8-5.)

DOD 4160.21-M

Defense Reutilization and Marketing Manual. (Cited in para 3-3*g*.) Department of Defense publications are available from the DEFENSE TECHNICAL INFORMATION CENTER, 8725 JOHN J KINGMAN ROAD SUITE 0944, FORT BELVOIR VA 22606.

DODI 4000.19

Interservice and Intragovernmental Support. (Cited in para 2-2*e*.)

DODI 4715.4

Pollution Prevention. (Published 18 June 1996; cited in para 3-3*f*.)

DODI 4715.5

Management of Environmental Compliance at Overseas Installations. (Cited in para 2-1*b*.)

EM 385-1-1

Safety and Health Requirements Manual. (Cited in para 8-1*b*.)

Memorandum of Agreement on Criteria/Standards For Economic Analyses/Life Cycle Costing For Milcon Design.

(Cited in para 2-2*h*.)

MIL-HDBK-419A

Grounding, Bonding, and Shielding for Electronic Equipment and Facilities Basic Theory. (Cited in paras 8-1*d* and 8-6*c*.)

MIL-STD-188-124A

Grounding, Bonding, and Shielding for Common Long Haul/Tactical Communication Systems. (Cited in para 8-6*c*.)

PWTB 420-47-06

Waste Reduction Methods for Food Service Personnel at Army Installations. Available at <http://www.hnd.usace.army.mil/techinfo/CPW/PWTB/420476.pdf> (Cited in para 3-3*j*.)

PWTB 420–47–07

Waste Reduction Methods for Food Service Personnel at Army Installations. Available at <http://www.hnd.usace.army.mil/techinfo/CPW/PWTB/420476.pdf> (Cited in para 3-3j.)

TB ENG 249

Repairs and Utilities: Coal Sampling. (24x microfiche; cited in paras 1-4h(1) and 5-3b(1).)

TB MED 530

Food Service Sanitation. (Cited in para 9-5b.)

TB MED 575

Swimming Pools and Bathing Facilities. (Cited in para 4-13c.)

TB MED 576

Sanitary Control and Surveillance of Water Supplies at Fixed Installations. (Cited in paras 4-1a, 4-3a, 4-7a, 4-7i, 4-7k, and 4-7m.)

Technical Instructions, Design Criteria (TI 800–01), U.S. Army Corps of Engineers

TI 800-01 is available from ATTN CEHNC-ED-ES-I, US ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE, PO BOX 1600, HUNTSVILLE AL 35807-4301. (Cited in paras 3-1d, 3-6a, 4-1h, 4-3b, 4-10d, 4-10e, 6-1b, 6-2c, 6-6a, 6-6b (3), 7-2c, 7-6b, 8-1a, 9-1c, and 9-5b.)

TM 5–634

Solid Waste Management. (Cited in paras 3-1c, 3-4a, and 3-6a.)

TM 5–636

Kitchen Equipment: Repairs and Utilities. (Cited in para 9-2b(1).)

TM 5–650

Repairs and Utilities: Central Boiler Plants. (Cited in paras 6-1c, 6-4a, 6-4c, 6-5a, and 10-3a.)

TM 5–653

Steam, Hot Water and Gas Distribution Systems: Inspection and Preventive Maintenance Service. (Cited in para 6-9a.)

TM 5–662

Repairs and Utilities Swimming Pool Operation and Maintenance. (Cited in paras 4-13c and 10-3a.)

TM 5–670

Repairs and Utilities for Refrigeration Air Conditioning, Mechanical Ventilation and Evaporative Cooling. (Cited in para 7-6c.)

TM 5–671

Repairs and Utilities: Preventive Maintenance for Refrigeration, Air-Conditioning, Mechanical Ventilation, and Evaporative Cooling. (Cited in paras 7-2e and 7-6c.)

TM 5–675

Repairs and Utilities: Solid Fuels Operations. (Cited in paras 5-3b and 5-3c.)

TM 5–682

Facilities Engineering: Electrical Facilities Safety. (Cited in para 8-1b.)

TM 5–683

Facilities Engineering: Electrical Interior Facilities. (Cited in para 8-1b.)

TM 5–684

Facilities Engineering: Electrical Exterior Facilities. (Cited in paras 8-1b, 8-3a(1), and 8-6b.)

TM 5–685

Facilities Engineering: Operation, Maintenance, and Repair of Auxiliary Generators. (Cited in para 8-1b.)

TM 5-810-17

Heating and Cooling Distribution Systems. (Cited in para 6-9a.)

TM 5-811-1

Electric Power Supply and Distribution. (Cited in para 8-5d.)

TM 5-811-3

Electrical Design: Lightning and Static Electricity Protection. (Cited in para 8-1d.)

TM 5-853-4

Security Engineering Electronic Security System. (Cited in para 8-7a.)

TM 9-1300-206

Ammunition and Explosives Standards. (Cited in para 8-1d and 8-6b.)

UFC 3-23002

Operation and Maintenance Water Supply System. (Cited in paras 4-1g, 4-5b, 4-7a, 4-7c, 4-7g, 4-7k, 4-7l, 4-10b, and 10-3a.)

UFC 3-240-03N

Operation and Maintenance: Wastewater Treatment Systems Augmenting Handbook. (Cited in paras 4-1g, 4-5b, 4-13c, and 10-3a.)

Air Conditioning and Refrigeration Institute Heat Pump Certification Program

(Cited in para 7-2e.)

RP 2015

Cleaning Petroleum Storage Tanks. (Cited in para 5-4a(4).)

ASHRAE Handbook of HVAC Systems and Applications

(Cited in para 7-6e.)

Section 7, Rules for Inspections: Care of Power Boilers

(Cited in para 6-3d.)

AWWA C651-86

Disinfecting Water Mains. (Cited in para 4-7b.)

AWWA C652-86

Disinfection of Water-Storage Facilities. (Cited in para 4-7b.)

AWWA C653-87

Disinfection of Water Treatment Plants. (Cited in para 4-7b.)

AWWA C654-87

Disinfection of Wells. (Cited in para 4-7b.)

AWWA Manual No. 19

Emergency Planning for Water Utility Management. (Cited in para 4-3a.)

NACE RP 0169-92

Control of External Corrosion on Underground or Submerged Metallic Piping Systems. (Cited in para 4-10f.)

NACE RP 0388-95

Impressed Current Cathodic Protection of Internal Submerged Surfaces of Steel Water Storage Tanks. (Cited in para 4-10f.)

National Electrical Safety Code

(Cited in paras 8-1b and 8-6b.)

NFPA Standard 54

The National Fuel Gas Code. (Cited in para 9–1*b*.)

NFPA 70

National Electrical Code. (Cited in para 8–8*a*.)

NFPA 70B

Electrical Equipment Maintenance. (Cited in para 8–1*b*.)

NFPA 70E

Standard for Electrical Safety Requirements for Employee Workplaces. (Cited in para 8–1*b*.)

NFPA Standard 90A

Installation of Air Conditioning and Ventilating Systems. (Cited in para 9–5*a*(2).)

NFPA Standard 96

Installation of Equipment for the Removal of Grease Laden Vapors from Commercial Cooking Equipment. (Cited in paras 9–1*a*, 9–5*a*(1), 9–5*a*(3), and 9–5*a*(4).)

NFPA No. 327

Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers. (Cited in para 5–4*a*(4).)

Section II**Related Publications**

A related publication is a source of additional information. The user does not have to read it to understand this regulation. . Note: Except as noted below, Army regulations and Administrative Departmental Publications and Forms (ARs, Cirrs, Pams, OFs, SFs, DD & DA Forms), are available online from the APD Website Army Publishing Directorate (<http://www.apd.army.mil/>). Army Doctrinal and Training Publications (FMs, PBs, TCs & STPs), except engineering & medical, are available through US Army Training and Doctrine Digital Library (<http://www.adtdl.army.mil/atdls.htm>). Army Technical and Equipment Publications (TMs, TBs & SCs), except engineering & medical, are available through US Army Logistics Support Activity (<http://www.logsa.army.mil/>). Army Engineering Publications (TMs & FMs), except administrative, are available through US Army Corps of Engineers (<http://www.usace.army.mil/usace-docs/>). Army Medical Publications (TMs, FMs, and SB 8-75-Series Publications), except administrative, are available through US Army Medical Department (<http://www.armymedicine.army.mil/default2.htm>). All departmental publications, including distribution-restricted items, are available through Army Knowledge Online (AKO) (<http://www.army.mil/ako/>). All unrestricted departmental publications are available through U.S. Army Home Page (AHP) (<http://www.army.mil/>).

a. Military.

AR 200–2

Environmental Effects of Army Actions.

AR 405–45

Real Property Inventory Management

AR 608–10

Child Development Services.

CEGS 02685

Gas Distribution Systems.

CEGS 15488

Gas Piping Systems.

ETL 1110–3–404

Utilities Systems Planning—Installation Comprehensive Planning.

MIL–HDBK 1138

Wastewater Treatment Systems

MIL-HDBK 1164

Operation and Maintenance of Water Supply Systems

PWB 420-10-08

Facilities Operation, Maintenance, and Repair Guidance for Base Realignment and Closing Installations.

PWTB 420-49-02

Source Reduction Planning. Available at the address above.

PWTB 420-49-07

Solid Waste Options. Available at the address above.

PWTB 420-49-08

Integrated Solid Waste Management. Available at the address above.

TM 5-642

Operator and Maintenance, Small Heating Systems.

TM 5-643

Repairs and Utilities: Preventive Maintenance for Heating Plants and Systems.

TM 5-644

Boiler Heating; Repairs and Utilities.

TM 5-646

Space Heaters; Repairs and Utilities.

TM 5-651

Central Boiler Plants; Inspection and Preventive Maintenance Services.

TM 5-654

Maintenance and Operation of Gas Systems.

TM 5-678

Repairs and Utilities: Petroleum, Oils, and Lubricants (POL).

TM 5-745

Heating, Ventilating, Air Conditioning and Sheet Metal Work.

TM 5-811-4

Engineering and Design: Corrosion Control.

TM 5-811-7

Electrical Design, Cathodic Protection.

EPA/530-SW-89-038

Yard Waste Composting. (Published April 1989.)

EPA/530-R95-023

Decision-Makers Guide to Solid Waste Management. (Published August 1995.)

EPA 570/9-89-002

Environmental Protection Agency Handbook General Public Notification For Public Water Systems.

RCS: DD-M(SA)1383

Environmental Protection Control Report.

RCS: DD-M(SA) 1485

Environment Management By Objective (MBS) Report.

RCS: MED-3
Command Health Report.

Section III

Prescribed Forms

Except where otherwise indicated below, the following forms are available as follows: DA Forms are available on the APD Web site (www.apd.army.mil).

DA Form 3916

Daily Log of Truck Trips for Refuse Collection and Disposal. (Prescribed in para 10-2a.)

DA Form 3917

Refuse Collection and Disposal. (Prescribed in para 10-2.)

DA Form 4141

Facilities Engineering Operating Log (Water—General). (Prescribed in para 10-3a.)

DA Form 4178

Facilities Engineering Operating Log (Sewage—Supplementary). (Prescribed in para 10-3a.)

DA Form 4247

Facilities Engineering Operating Log (Sewage—General). (Prescribed in para 10-3a.)

DA Form 4374

Repairs and Utilities Operating Log (Water—Supplementary). (Prescribed in para 10-3a.)

Section IV

Referenced Forms

Except where otherwise indicated below, the following forms are available as follows: DA Forms are available on the APD Web site (www.apd.army.mil); DD Forms are available from the OSD Web site (www.dtic.mil/whs/directives/infomgt/forms/formsprogram.htm).

DA 11-2-R

Management Control Evaluation Certification Statement

DD Form 250

Materiel Inspection and Receiving Report

Appendix B

Materials for Disposal by Army Activities

The following materials will not be turned in to DRMO for disposal. Disposal of these materials is the responsibility of the generating activity.

B-1. Toxicological, biological, radioactive, and lethal chemical warfare materials that, by U.S. law, must be destroyed

Disposal of the by-products of such material is the responsibility of the DOD component generating the waste, with assistance from DLA.

B-2. Materials, such as radioactive substances and controlled medical items, that cannot be disposed of in their present form because of military regulations

This category of materials would include those instances in which military regulations require the obliteration of all markings that could relate an excess material to its operational program. Once the appropriate actions are taken by the turn-in activity to meet regulatory requirements, the resulting material could then be turned in to the servicing DRMO.

B-3. Municipal-type garbage, trash, and refuse resulting from residential, institutional, commercial, agricultural, and community activities that the DPW routinely collects

B-4. Contractor-generated materials that are the contractor's responsibility for disposal under the terms of the contract

Wastes, generated by a contractor operator at a Government-owned, contractor-operated (GOCO) activity, which are related to the production of ammunition and generated by authority of the Plant Utilization Policy, are not DRMS responsibilities.

B-5. Sludge resulting from municipal wastewater treatment facilities and water treatment facilities

B-6. Sludge and residues generated as a result of industrial plant processes or operations

The hazardous waste generators are responsible for—

- a. Disposal of sludge and residues resulting from industrial waste treatment facilities.
- b. Commingled materials, resulting from industrial plant facilities, that are accumulated into commingled storage for disposition instead of processing through industrial waste treatment facilities.

B-7. Refuse and other discarded materials that result from mining, dredging, construction, and demolition operations

B-8. Unique wastes and residues of a nonrecurring nature that research and development experimental programs generate

Appendix C
Management Control Evaluation Checklist

C-1. Function

The function covered by this checklist is garrison utilities.

C-2. Purpose

The purpose of this checklist is to assist the Director of Public Works in evaluating the key management controls outlined below. It is not intended to cover all controls.

C-3. Instructions

Answers must be based on the actual testing of key management controls (for example, document analysis, direct observation, sampling, simulation, other). Answers that indicate deficiencies must be explained and corrective action indicated in supporting documentation. These key management controls must be formally evaluated at least once every 5 years. Certification that this evaluation has been conducted must be accomplished on DA Form 11-2-R (Management Control Evaluation Certification Statement). A copy of this form is located at the back of this publication.

C-4. Test questions

a. General.

- (1) Where LCC effective, are utility services obtained from local, municipal, or regional (public and private) authorities?
- (2) Do garrisons participate in local, municipal, and regional utility planning organizations?
- (3) Do utility services comply with all applicable Federal, State, and local standards, laws, and regulations?
- (4) Are applicability of State and local laws and regulations for garrison utility services referred to the garrison Staff Judge Advocate General for interpretation?
- (5) Do OCONUS Army garrisons comply with the final governing standards (FGS) issued by the Department of Defense (DOD) Executive Agent for the host nation concerned?
- (6) Has an Installation Utilities Management Plan (IUMP) been developed and implemented?
- (7) Have a utility vulnerability analyses and remedial action plans been prepared to ensure mission support in event of disruption to major utility systems?
- (8) Have emergency response plans for each type of utility service been prepared?
- (9) Do garrisons with gas (natural gas, manufactured gas, and vaporized LPG products, that is, propane and propane/air mixtures) distribution systems provide training for personnel working on or involved with the design, construction, or management of these systems in accordance with 49 CFR 192?
- (10) Is all work properly classified in accordance with AR 420-10?

b. Certification of utility plant operators.

- (1) Are all utility plant operators and maintenance personnel licensed by governing authorities with certification or licensing programs that meet Army or applicable State and local standards?

(2) Are contract personnel properly and currently licensed by the appropriate authority of the political subdivision in the vicinity?

c. Solid waste management.

(1) Are proper storage containers used and are pick-up stations located for maximum efficiency for the storage, collection, and transportation of nonhazardous waste?

(2) Are collection operations periodically evaluated to ensure the most efficient operation?

(3) Does all equipment used for solid waste collection meet standards for operational safety published in Federal regulations and guidelines, Army guidelines, and host country guidelines and regulations?

(4) Are source separation, resource recovery, and recycling programs determined to be life cycle cost-effective prior to establishment or expansion of such programs?

(5) Are management policies and procedures for the recycling program established?

(6) Are new or expanded facilities justified?

(7) Does the design of new or expanded facilities comply with current engineering standards and all Federal, State, and local regulations or host country regulations?

(8) Are thermal processing facilities and landfills operated and maintained efficiently and safely in accordance with Federal, State, or local standards?

(9) Are proper disposal arrangements made for ash and residue from thermal processing facilities so the materials will be disposed of in an environmentally safe manner?

d. Water supply and wastewater.

(1) Are monitoring equipment and billing procedures the most feasible and necessary for the Government for the purchase and sale of water and wastewater services?

(2) Is quality control of water supply, treatment, storage, and distribution facilities and wastewater collection and treatment systems maintained?

(3) Are laboratory facilities properly certified?

(4) Is usefulness of active deep wells maximized?

(5) Are appropriate water supply conservation analyses systematically conducted?

(6) Will water supply and wastewater facility operation and maintenance continue in times of national or local emergencies?

(7) Are water users protected?

(a) Are water users notified of any actual or anticipated noncompliance with water quality, including microbiological, chemical, pesticide and radiological analyses reports; excessive contaminant levels; inadequate procedures or frequencies; and all approved or requested variations in water quality or exemptions to surveillance criteria?

(b) Is the Health Command Report (RCS MED-3) (AR 40-5) used to report all violations, variations, and exemptions in water quality and variations and violations of an exemption to wastewater facility surveillance requirements to the MACOM?

(8) Are inspections conducted and acted upon?

(a) Are results of water and wastewater facility inspections and water quality tests conducted by Federal and State agencies reported?

(b) Are all major operational changes that are recommended in inspection reports recorded and acted on?

(c) Are inspection reports submitted to HQDA and maintained in appropriate files?

(9) Is quality maintained over water supply and wastewater facility operations?

(a) Are variations in water quality or exemptions to water surveillance criteria as recorded in analysis reports reviewed?

(b) Are variations and violations of any exemption to wastewater facility surveillance criteria, as reported in the Command Health Report, reviewed?

(c) Are those variations that will not pose a risk to water users approved?

(d) Is technical assistance and/or directives to correct reported violations provided?

e. Heating, energy selection, and fuel storage, distribution, and dispensing systems.

(1) Are all fuel-burning facilities equipped with air pollution abatement equipment or using the type of fuel that meets the Federal, State, or local requirements for environmental pollution abatement?

(2) Are energy conservation programs established in accordance with this regulation and AR 11-27?

(3) Has an effective corrosion control program been established in accordance with this regulation and TM 5-811-4?

(4) Is the most economical grade of coal or oil used consistent with air pollution abatement criteria for coal-burning or multi-grade oil-burning equipment?

(5) Are piping and valves in central boiler plants, outside distribution systems, and in main distribution system(s) in buildings marked with color banding and/or titles to indicate contents or purpose?

(6) Are Government-owned and operated boilers and boilers operated by private contractors inspected by qualified inspectors of a recognized insurance company or other agency capable of performing such work?

(7) Are heating and cooling distribution systems properly maintained?

(8) Are water softeners and soft water supplies for central laundries, mess halls, hospitals, dental clinics, laboratories, and other facilities provided in accordance with TM 5-813-3?

(9) Are safety procedures outlined in this regulation and TM 5-652 for the supply, storage, and distribution of natural and LP gases complied with?

(10) Are periodic leakage tests on underground gas distribution systems performed per TM 5-652?

(11) Is boiler water monitored and treated as required?

(12) Are chemicals used for boiler water treatment purposes or for corrosion prevention purposes in condensate-return lines procured on the basis of a single chemical content, provided that other chemicals in the product do not exceed 10 percent by weight of the total chemical ingredients?

(13) Are energy sources for conversions or new construction selected with careful consideration of national reserves, balance of payments, economics, availability, and the extent that sources are renewable in the natural environment?

(14) Are contingency plans prepared for potential interruptions of existing and proposed sources of energy?

(15) Are patching and hot work operations on tanks performed safely? Are personnel aware of potential hazards and following safety practices and precautions for patching and hot work operations?

f. Air conditioning and refrigeration.

(1) Is air conditioning, refrigeration, and ventilation equipment in compliance with the AEI?

(2) Is operation, maintenance, and repair of air conditioning, evaporative cooling, dehumidification, and mechanical ventilation equipment in accordance with TM 5-671?

(3) Are automatic controls and alarms properly installed in appropriate facilities?

(4) Are facilities safeguarded by testing, inspecting and maintaining automatic controls and alarms on a regular scheduled basis?

(5) Are gas masks available where toxic refrigerants are used?

g. Electric service.

(1) Are all electric services and equipment in accordance with the National Electric Code?

(2) Is maintenance on all electric services and equipment in accordance with NFPA 70B, TM 5-683, TM 5-684, TM 5-685, TM 9-1300-206, and the National Electrical Safety Code (NESC)?

(3) Is a power system analysis of the garrison conducted at least every 5 years?

h. Food service and related equipment.

(1) Is food service and related equipment in accordance with this regulation and CTA 5-911?

(2) Is food service and related equipment compatible with utility characteristics (including electrical voltage, phases, frequency, and current available; gas type and pressure; or water pressure and capacity if applicable)?

(3) Are health and safety standards adhered to for equipment garrison?

(4) Is equipment properly installed in accordance with National Fire Protection Association Standards?

(5) Have user training programs been developed and conducted for the operation, preventive maintenance, and energy conservation of food service and other related equipment?

C-5. Supersession

This checklist replaces the checklists for AR 420-15, AR 420-46, AR 420-47, AR 420-49, AR 420-54, and AR 420-55, previously published in DA Circular 11-87-4, and for AR 420-43, previously published in DA Circular 11-93-1.

C-6. Comments

Help make this a better tool for evaluating management controls. Submit comments to the Assistant Chief of Staff for Installation Management: ATTN DAIM-FDF-U, ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT, 600 ARMY PENTAGON, WASHINGTON DC 20310-0600.

Glossary

Section I Abbreviations

ACSIM

Assistant Chief of Staff for Installation Management

AEI

U.S. Army Corps of Engineers architectural and engineering instructions

AFM

Air Force manual

API

American Petroleum Institute

AR

Army regulation

ARI

American Refrigeration Institute

ARNG

Army National Guard

ASA(I,L,-E)

Assistant Secretary of the Army (Installations, Logistics, and Environment)

ASHRAE

American Society of Heating, Refrigeration, and Air Conditioning Engineers.

ASME

American Society of Mechanical Engineers

ASTM

American Society for Testing and Materials

ATCOM

U.S. Army Aviation and Troop Command

AWWA

American Waterworks Association

BPVI

Boiler and Pressure Vessel Inspectors

CEGS

Corps of Engineers Guide Specification

CEHNC

U.S. Army Engineering and Support Center

CFR

Code of Federal Regulations

CG

commanding general

COE

Chief of Engineers

CONUS

Continental United States

CTA

common table of allowances

CWA

Clean Water Act

DA

Department of the Army

DEAE

diethylaminoethanol

DFSC

Defense Fuel Supply Center

DLA

Defense Logistics Agency

DOD

Department of Defense

DODD

Department of Defense directive

DPW

Director of Public Works

DRMO

Defense Reutilization and Marketing Office

DRMS

Defense Reutilization and Marketing Service

EPA

U.S. Environmental Protection Agency

ETL

Engineers technical letter

FGS

final governing standards

FWPCA

Federal Water Pollution Control Act

GOCO

Government-owned, contractor-operated

HQDA

Headquarters, Department of the Army

HTW

high-temperature water

HWMP

Hazardous Waste Management Plan

IDS

Intrusion Detection System

IMA

Installation Management Agency

INSCOM

U.S. Army Intelligence and Security Command

ISWM

Integrated Solid Waste Management

IUMP

Installation Utilities Management Plan

IWRAPS

Installation Water Resources Analysis and Planning System

LCC

life cycle cost

LPG

liquified petroleum gas

MACOM

major Army command

MBO

management by objective

MCA

Military Construction, Army

MCX

Mandatory Center of Expertise

MDA

Memorandum of Agreement

MSWLF

municipal solid waste landfill

NACE

National Association of Corrosion Engineers

NAF

nonappropriated fund

NEC

National Electrical Code

NEPA

National Environmental Policy Act

NESC

National Electrical Safety Code

NFPA

National Fire Protection Association

NPDES

National Pollutant Discharge Elimination System

NPS

non-point source

OCONUS

outside Continental United States

OSHA

Occupational Safety and Health Act

PAM

pamphlet

PL

public law

POL

petroleum, oils, and lubricants

ppm

parts per million

PPP

Prime Power Program

PWB

Public Works bulletin

PWTB

Public Works technical bulletin

QRP

qualifying recycling program

RCRA

Resource Conservation and Recovery Act

RCS

Requirement Control Symbol

RDF

refuse derived fuel

RP

recommended practice

SCP

Spill Contingency Plan

SDWA

Safe Drinking Water Act

SOP

standing operating procedure

SPCCP

Spill Prevention Control and Countermeasures Plan

SWDA

Solid Waste Disposal Act

SWM

solid waste management

TB

technical bulletin

TB MED

technical bulletin, medical

TM

technical manual

UPS

uninterruptible power supply

USACE

U.S. Army Corps of Engineers

USACHPPM

U.S. Army Center for Health Promotion and Preventive Medicine

USAISC

U.S. Army Information Systems Command

USACPW

U.S. Army Center for Public Works

USAPC

U.S. Army Petroleum Center

USAQMC-S

U.S. Army Quartermaster Center and School

USAR

U.S. Army Reserve

USC

United States Code

WRMP

Water Resource Management Plan

Section II**Terms****Air conditioning**

A method of reducing air temperature by mechanical means. Air conditioning may be done with either mechanical or absorption refrigeration systems and equipment.

Alternate fuel

The energy source for which a plant is equipped to operate either simultaneously with the primary fuel or instead of the primary fuel with minor adjustments to the combustion equipment.

Army Garrison

A designated grouping of real property, controlled and managed by the U.S. Army, to which one or more Army organizations is assigned. (For purposes of this regulation, the USAR real property controlled and managed by a USAR Regional Support Command within its assigned standard federal region comprises an "installation.")

Auxiliary generators (auxiliary generating units)

Electric power sources, other than prime power generating units, used to supply electricity on a temporary, regular, or uninterruptible basis. Includes motor-generators, frequency converters, engine-driven or turbine-driven conventional generators, uninterruptible power supplies, fuel cells, solar photovoltaic generators, and wind generators.

Base power system

The Army-owned portion of an electrical distribution system. It consists of a source of electricity (generator, intake station from an off-post source, or both), lines, transformers, and associated control and protective devices needed to distribute electric power and provide exterior lighting throughout the garrison. The system is carried on the Inventory of Military Real Property as facilities classes 136, 810, 811, 812, and 813.

Bulk waste

Large items of solid waste, such as household appliances, furniture, large auto parts, trees, branches, stumps, and other oversize waste, for which large size precludes or complicates handling by normal solid waste collection, processing, or disposal methods.

Cell

Compacted solid waste enclosed by natural soil or cover material in a land disposal site. (40 CFR 241)

Central air-conditioning plant

A single-point source (one location) of refrigeration that may supply one or more air handling units or fan-coil units. A central plant will be a single integrated system serving all the permissible spaces of a building or group of buildings.

Closed landfill

A sanitary landfill where all cells have been completely utilized, the disposal of solid waste has ended, and the owner or operator has closed in accordance with the approved facility closure plan and all applicable closure requirements (40 CFR 260).

Coal

For purposes of this regulation, the designation *coal* includes anthracite, bituminous, sub-bituminous, culm, and lignite.

Commercial solid waste

All types of solid waste (excluding hazardous waste) generated by stores, offices, clubs, cafeterias, dining facilities, warehouses, and other non-manufacturing activities. This includes non-processing waste generated at industrial facilities such as packing waste and paper products. Construction and demolition waste are not included in this category.

Composting

Composting is the controlled biological decomposition of organic solid waste under aerobic conditions.

Construction

- a. The erection, garrison, or assembly of a new facility.
- b. The addition, expansion, extension, alteration, conversion, or replacement of an existing facility.
- c. The relocation of a facility from one garrison to another.
- d. Installed equipment made a part of the facility, related site preparation, excavation, filling, landscaping, or other land improvements.

Construction and demolition waste

The waste building materials, packaging and rubble resulting from construction, alteration, remodeling, repair, and demolition operations on pavements, houses, buildings, and other structures.

Conversion

Removal of installed energy utilization (fuel-burning) equipment and garrison of equipment to use a different energy source. Included under the designation *conversion* are the following:

- a. Change in energy source in a repair project.
- b. Replacement of a boiler or furnace with a new unit that uses a different energy source.
- c. The expansion of an existing plant or system by the addition of boilers or heating equipment using an energy source other than that used in the plant or system being expanded. Selection of a different fuel from that being used in the existing plant must be economically supportable (LCC basis).
- d. A change in energy source to meet air pollution emission standards.

Note. The addition of dual-fuel capability to existing systems is not considered a conversion for purposes of this regulation.

Dehumidifying

The reducing, by any process, of the quantity of water vapor within a given space, regardless of dry bulb temperature.

Dual-fuel plant

Heating unit, boiler, or power plant which has been completely and permanently equipped to use either of two energy sources at any time with only minor operational changes required to switch from one energy source to the other. In these cases, one energy source will be designated as the *primary fuel* and the second as the *alternate fuel*.

Emergency generators

Auxiliary generators used as alternate temporary sources of power. They operate either manually or automatically to supply electricity when the normal supply fails. They are sometimes called standby generators.

Energy source

Includes all types of solid, liquid, and gaseous fuels, electricity, refuse-derived fuels, solar and geothermal energy, and other technically feasible alternatives. Also, includes heat or fuel source that is available as a by-product of electrical power generation or process operation.

Equipment in place

Any fixed property that is not real property on the DPW records.

Evaporative cooling

The process by which the dry bulb temperature of the air is reduced while the wet bulb temperature remains constant.

Existing landfill

A sanitary landfill that is in existence, operation, or both. An existing landfill may be divided into cells for operation, planning, and management purposes.

Facility

A building, structure, or other real property improvement. Ships at sea, aircraft in the air, or forces on maneuvers are not subject to this regulation.

Failed or failing landfill

A sanitary landfill from which the ground or surface water is being polluted and consequently causing non-compliance with pollution control standards or regulations, or both.

Food service and related food service equipment

- a.* Food service equipment includes mechanical, cooking, and other equipment, excluding utensils used in preparing, processing, and serving foods.
- b.* Related food service equipment includes items of equipment used in support of the preparation, processing, serving, and preservation of foods; disposition of garbage; and cleaning of wares. For example, dish and pot and pan washing equipment and ventilation hoods are related food service equipment items.
- c.* Installed air conditioning, refrigeration (for example, built-in reefers), and ventilation equipment, other than hoods, will not be classified as food service or related food service equipment.
- d.* Food packaging and processing equipment used in commissaries are not food service equipment.

Frequency converters

Electrically driven generators (either rotary or solid state) in which the input and output frequencies are different and the input and output voltages and number of phases may be the same or different.

Garrison

See Army Garrison.

Gas

Any gas, including, but not limited to, natural gas, manufactured gas, and evaporated LPG products (propane or propane/air mixtures), that is distributed through a pipe line.

Hazardous waste

A solid waste not specifically excluded from the restrictions of Federal regulations (42 U.S.C. 6901, et seq. that meets the criteria listed in 40 CFR 261 or is specifically named as a hazardous waste in Federal regulations.

Heating installations and plants

Plants generating steam, hot water, or warm air may consist of one or more furnaces, boilers, or hot water generators. The designation includes all such units in the plant, building, or room (for example, three 100 MBTU boilers, either in a separate heating plant or in a mechanical room in a building, constitute a 300 MBTU heating plant).

High-grade paper

Letterhead, dry copy paper, miscellaneous business forms, stationery, typing paper, tablet sheets, and computer printout paper and cards commonly sold as white ledger, computer printout, and tab card grade by the wastepaper industry. High-grade paper is included in the commercial solid waste category.

Household hazardous waste

Waste resulting from products purchased by the general public for household use that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may pose a substantial known or potential hazard to human health or the environment when improperly treated, disposed of, or otherwise managed.

Humidity control

The controlling, by any process, of the quantity of water vapor within a given space, regardless of dry bulb temperature.

Installed equipment

Real property on the records of the DPW, including all permanently attached equipment normally considered parts of structures.

Integrated Solid Waste Management

Army solid waste policy is based on the concept of Integrated Solid Waste Management (ISWM). The concept of ISWM is designed to minimize the initial input to the waste stream through source reduction, reduce the volume of the waste stream requiring disposal through re-use and recycling, and finally dispose of solid waste through the effective combination of incineration, composting, and landfill disposal.

Leachate

Liquid that has percolated through solid waste and has extracted dissolved or suspended materials from it.

Mechanical ventilation

The process of using mechanical means to continuously replace with outside air the air in any space in a building.

Municipal solid waste landfill

A discrete area of land or an excavation, on or off an installation, that receives household waste and that is not a land application unit, surface impoundment, injection well, or waste pile. A municipal solid waste landfill unit also may receive other types of waste, such as commercial solid waste or industrial waste.

New landfill

A sanitary landfill that is not designed as a part of the initial plan of an existing landfill or is newly created without an existing landfill contiguous to it. Any natural or manmade boundaries, for example, surface waters, roads, railroads, adjoining to the existing landfill, will not preclude the status of the contiguity.

Office waste

Solid waste generated in the buildings or rooms in which the affairs of business, professional persons, or branches of Government, are carried on. Excluded is waste generated in cafeterias, snack bars, or other food preparation and sales areas, and waste separated by medical personnel.

Primary fuel

The major energy source currently in use in the boilers or heating equipment.

Power plants

Plants generating steam or high-temperature water for the production of electric power or compressed air.

Qualifying recycling programs

Organized operations that require concerted efforts to—

- a.* Divert or recover scrap or waste from waste streams.
- b.* Identify, segregate, and maintain the integrity of the recyclable materials to maintain or enhance the marketability of the materials.

Recoverable resources

Materials that have useful physical or chemical properties after serving their original purposes. Recoverable resources can be re-used or recycled for the same or for other purposes.

Recyclable materials

The term *recyclable materials* includes materials diverted from the solid waste stream and the beneficial use of such materials. Recycling is further defined as the result of a series of activities by which materials that would become or otherwise remain waste, are diverted from the solid waste stream by collection, separation, and processing and are used as raw materials in the manufacture of goods sold or distributed in commerce or the reuse of such materials as substitutes for goods made of virgin materials. Examples of recyclable materials include (but are not limited to) the following: paper, food waste, plastic, glass, all cardboard and other packaging materials, newspapers, and empty food and beverage containers. Recyclable materials also include scrap (including ferrous and nonferrous scrap) and firing range expended brass and mixed metals gleaned from firing range cleanup that do not require demilitarization. Items requiring demilitarization or mutilation prior to sale are not recyclable materials. For the purpose of this regulation, the following materials are not recyclable materials and will not be sold through a QRP: precious metals; Government-furnished materials; hazardous waste (including household hazardous waste); machine parts; electrical components; unopened containers of unused oil, solvents, or paints; and repairable items that have not progressed through the disposal cycle.

Recycling

The series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

Refuse derived fuel

Processed refuse and waste suitable for use as a primary or secondary fuel in solid-fuel boilers.

Residential solid waste

Includes garbage, rubbish, trash, and other solid waste resulting from the normal activities of households.

Resource recovery

The process of obtaining materials or energy from solid waste or used POL product.

Resource recovery facility

Any physical plant that processes residential, commercial, or institutional solid waste biologically, chemically, or physically and recovers useful products (such as shredded fuel, combustible oil or gas, steam, metal, or glass) for resale or re-use.

Re-use

The use of a product more than once in its same form for the same purpose; for example, a soft-drink bottle is reused when it is returned to the bottling company for refilling.

Sanitary landfill

A land disposal site employing an engineered method of disposing of solid waste on land in a manner that minimizes environmental hazards by spreading the solid waste in thin layers, compacting the solid waste to the smallest practical volume, and applying and compacting cover material at the end of each operating day (40 CFR 241)

Site footprints

Original dimensions of the sanitary landfill (existing or closed).

Sludge

The accumulated semi-liquid suspension of settled solids deposited from wastewater or other fluids in tanks or basins.

Solid fuel

For purposes of this regulation, the designation *solid fuel* includes all solid fossil fuels (see coal) and RDF.

Solid waste

Garbage, refuse, sludge, and other waste materials not excluded by Federal regulations. Any solid, liquid, semi-solid, or contained gaseous materials resulting from institutional, industrial, commercial, mining, agricultural, or community operations and activities. They are discarded or being accumulated, stored, or treated prior to being discarded. Infectious waste materials are not included in this category for purposes related to recycling. A material is discarded if it is abandoned (and not used, re-used, reclaimed, or recycled) by being disposed of, burned, or treated.

Source reduction

Source reduction programs can reduce the volume of the solid waste stream. Reducing the amount of material that reaches the installation and will require disposal is an effective and efficient means to reduce solid waste volume. Consideration should be given to how items are packaged when choosing products. The minimum packaging that will ensure safe arrival and meet installation storage and handling needs should be selected.

Source separation

The separation of materials at their point of generation by the waste generator.

Space conditioning

The simultaneous control of any or all factors of temperature, humidity, motion, distribution, or purity of the air within a structure. As used in this regulation, it does not include heating.

Standby fuel

The energy source used when the primary fuel is interrupted.

Treatment

Any method, technique, or process (including neutralization) designed to change the physical, chemical, or biological character or composition of any hazardous waste.

Unit

A boiler, furnace, hot water generator, or similar energy converting device. Tandem energy generating hook-ups designed to match variable loads are considered a "unit," with a capacity equal to the sum of the parts.

Utility plants

Heating, refrigeration, air conditioning, liquid and gas fuel storage, distribution, and dispensing, electric generating, water and waste treatment plants, including all systems (for example, apparatus and equipment) necessary to provide utility services and to control environmental pollution.

Utility Systems/Infrastructure

utilities Utility Systems/Infrastructure includes all the facilities and systems that provide water supply, wastewater, solid waste (nonhazardous) management and disposal, electric power, heating, cooling, and refrigeration.

Vector

A carrier, usually an arthropod, that is capable of transmitting a pathogen from one organism to another.

Yard waste

Grass and shrubbery clippings, tree limbs, leaves, and similar organic materials commonly generated in residential yard maintenance (also known as green waste).

Section III**Special Abbreviations and Terms**

This section contains no entries.

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